



IEI Technology Corp .



# KINO-LX

**Mini-ITX Motherboard with AMD LX 800 500 MHz CPU**  
**Dual LAN, SATA, USB, Six COM Ports and Audio**

## User Manual

Rev. 1.10 April, 2008



# Revision

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Date	Version	Changes
2008-04	1.10	<ul style="list-style-type: none"><li>- Modified memory compatibility</li><li>- Changed PCI-to-SATA bridge to VIA VT6421A</li><li>- Changed the document format.</li></ul>
2006-11	1.00	Initial release

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# Packing List



## NOTE:

If any of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the KINO-LX motherboard from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to [sales@iei.com.tw](mailto:sales@iei.com.tw).

The items listed below should all be included in the KINO-LX motherboard package.

- 1 x KINO-LX single board computer
- 1 x IDE flat cable
- 2 x Dual RS-232 cables
- 2 x SATA cables
- 1 x SATA power cable
- 1 x IO shielding
- 1 x Mini jumper pack
- 1 x Quick installation guide
- 1 x Utility CD

Images of the above items are shown in **Chapter 3**.



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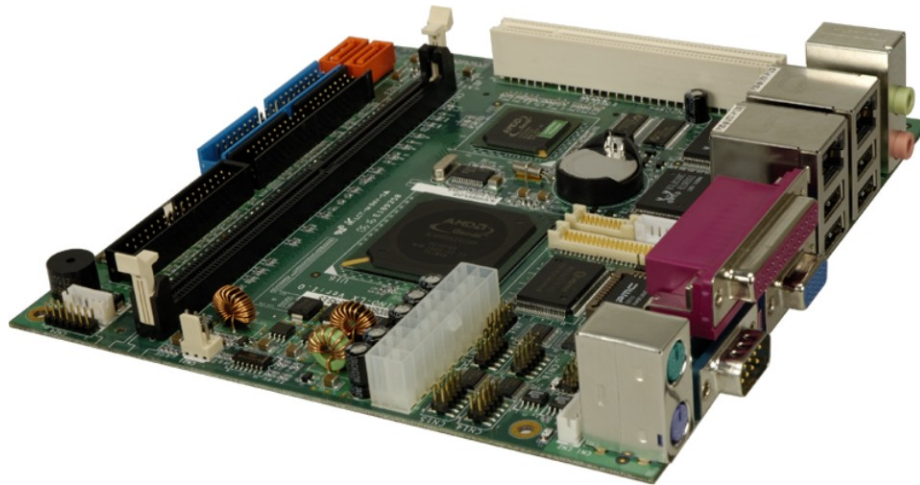
Chapter

1

# Introduction

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## 1.1 KINO-LX Motherboard Overview



### Figure 1-1: KINO-LX Mini-ITX Motherboard

The Mini-ITX form factor KINO-LX AMD Geode™ LX 800 is a highly-integrated embedded computer specifically optimized for multi-media applications requiring minimum installation space. The KINO-LX is particularly suitable for low power and fan-less applications. The KINO-LX is equipped with an on board low-power consumption and high performance AMD Geode™ LX 800 processor. It also contains a DDR DIMM socket that supports up to 1GB memory in size.

### 1.1.1 KINO-LX Motherboard Applications

The KINO-LX SBC has been designed for use in industrial applications where board expansion is critical and operational reliability is essential.

### 1.1.2 KINO-LX Motherboard Features

Some of the KINO-LX SBC features are listed below:

- Complies with RoHS
- Supports AMD Geode™ LX 800 500MHz CPU
- Supports up to 1GB of 333 MHz single channel DDR memory
- Comes with one high performance gigabit Ethernet (GbE) controller
- Supports two SATA channels with transfer rates up to 1.5 GB/s and RAID 0, 1 support

## KINO-LX Mini-ITX SBC

- Supports four USB 2.0 connectors

### 1.2 KINO-LX SBC Overview

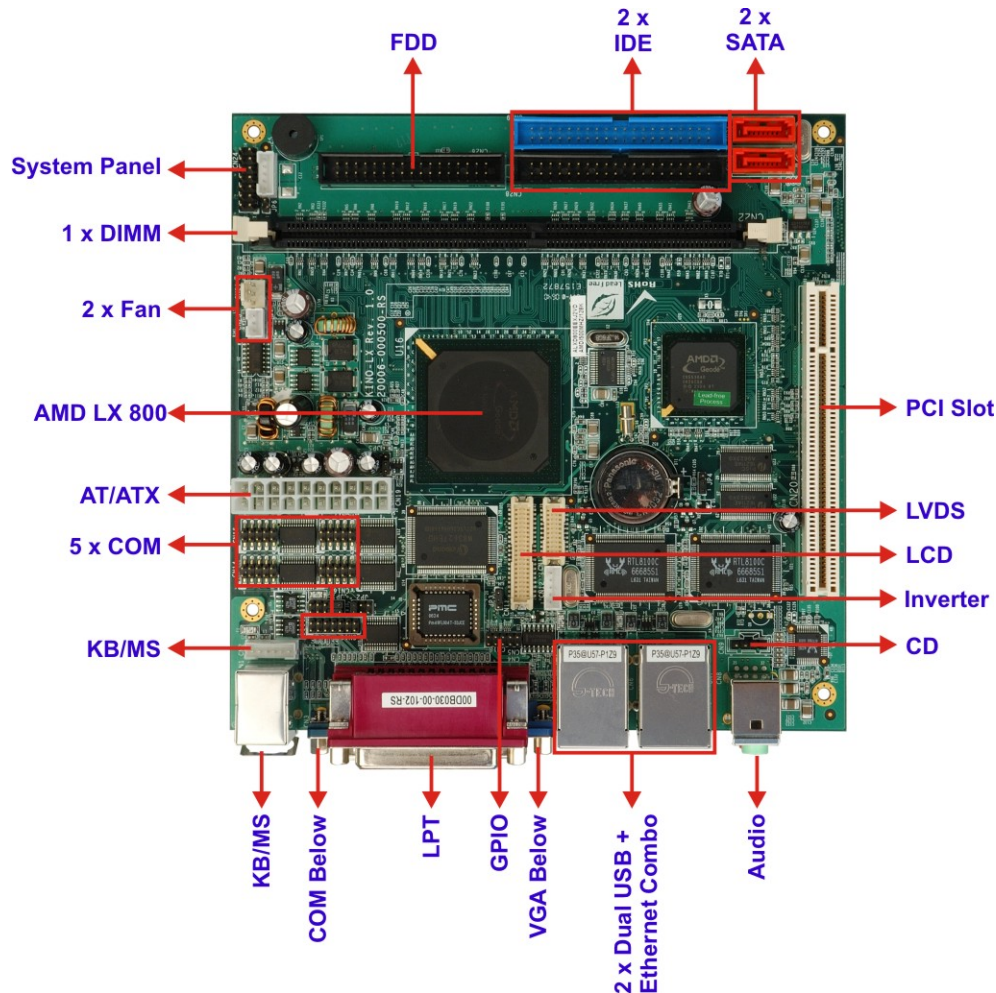


Figure 1-2: KINO-LX Motherboard Overview (Front Side)

#### 1.2.1 KINO-LX Motherboard Connectors

The KINO-LX has the following connectors onboard:

- 1 x 184-pin DDR DIMM socket
- 1 x AT/ATX power connector
- 1 x CD-IN connector
- 2 x Fan connectors

- 1 x Floppy disk connector
- 1 x Front panel connector
- 1 x GPIO connector
- 2 x IDE Interface connectors
- 1 x Inverter power connector
- 1 x Keyboard/Mouse connector
- 1 x LCD LVDS interface Connector
- 1 x LCD TTL interface Connector
- 1 x RS-422/485 serial port connector
- 1 x PCI slot connector
- 4 x RS-232 serial port connectors
- 1 x RS-232/422/485 serial port connector
- 2 x SATA connectors

The KINO-LX has the following connectors on the board rear panel:

- 1 x Audio connector (two audio jacks)
- 2 x Ethernet connectors
- 2 x PS/2 keyboard/mouse connectors
- 1 x LPT port connector
- 1 x RS-232 serial port connector
- 4 x USB connectors
- 1 x VGA connector

The KINO-LX has the following onboard jumpers:

- AT/ATX power mode select
- Clear CMOS
- COM1/2 RI and voltage select
- COM2 RS-232/422/485 select
- LCD clock setup
- LCD voltage select

The location of these connectors on the SBC can be seen in **Figure 4-19**. These connectors are fully described in **Chapter 2**.



## KINO-LX Mini-ITX SBC

### 1.2.2 Technical Specifications:

KINO-LX SBC technical specifications are listed in **Table 1-1**. Detailed descriptions of each specification can be found in **Chapter 2**.

SPECIFICATION	DESCRIPTION
<b>CPUs Supported</b>	AMD Geode™ LX 800
<b>Cache Memory</b>	64K I/ 64k D L1 cache, 128K L2 cache
<b>System Chipset</b>	AMD CS5536
<b>I/O Controller</b>	AMD CS5536
<b>Memory</b>	One 184-pin 333 MHz DDR DIMM supported (system max. 1GB)
<b>PCI Bus Interface</b>	Revision 2.2
<b>Super IO</b>	Winbond W83627EHG
<b>Display</b>	CRT integrated in AMD Geode™ LX 800
<b>LVDS</b>	Single channel 18-bit LVDS integrated in Geode™ LX 800
<b>TTL</b>	24-bit TTL integrated in AMD Geode™ LX 800
<b>HDD Interface</b>	One IDE channel supports two Ultra ATA 100/66/33 devices
<b>Power Support</b>	ATX power support
<b>Power Consumption</b>	+5V @ 1.45A (500MHz AMD Geode™ LX 800 with 333MHz 512MHz MB-HCT DDR)
<b>Power Management</b>	Supports Advanced Configuration and Power Interface (ACPI) Specifications Revision 2.0
<b>Watchdog Timer</b>	Software programmable supports 1~255 sec. system reset
<b>Serial ATA (SATA)</b>	Two SATA channels with 1.5 Gb/s transfer rates

SPECIFICATION	DESCRIPTION
	RAID 0, 1 support
<b>Floppy Disk Drive (FDD)</b>	Supports FDD
<b>USB Interfaces</b>	Four USB 2.0 connectors supported
<b>Serial Ports</b>	Six RS-232 and one RS-422/485 COM ports
<b>Audio Interfaces</b>	Realtek ALC203
<b>PCI Interface</b>	PCI slot connector
<b>Real Time Clock</b>	256-byte battery backed CMOS RAM
<b>Hardware Monitoring</b>	CPU temperature and system voltages
<b>Ethernet</b>	Two 10/100 Base-T Realtek RTL8100C Ethernet controllers
<b>BIOS</b>	AWARD
<b>Physical Dimensions</b>	170 mm x 170 mm
<b>Operating Temperature</b>	Minimum: 0°C (32°F) - Maximum: 60°C (140°F)
<b>Operating Humidity</b>	Minimum: 5% - Maximum: 95%
<b>Weight</b>	Gross: 1.1Kg - Net: 500g

**Table 1-1: Technical Specifications**

Chapter

2

# Detailed Specifications

---

## 2.1 Overview

This chapter describes the specifications and on-board features of the KINO-LX in detail.

## 2.2 Dimensions

### 2.2.1 Board Dimensions

The dimensions of the board are listed below:

- **Length:** 170 mm
- **Width:** 170 mm

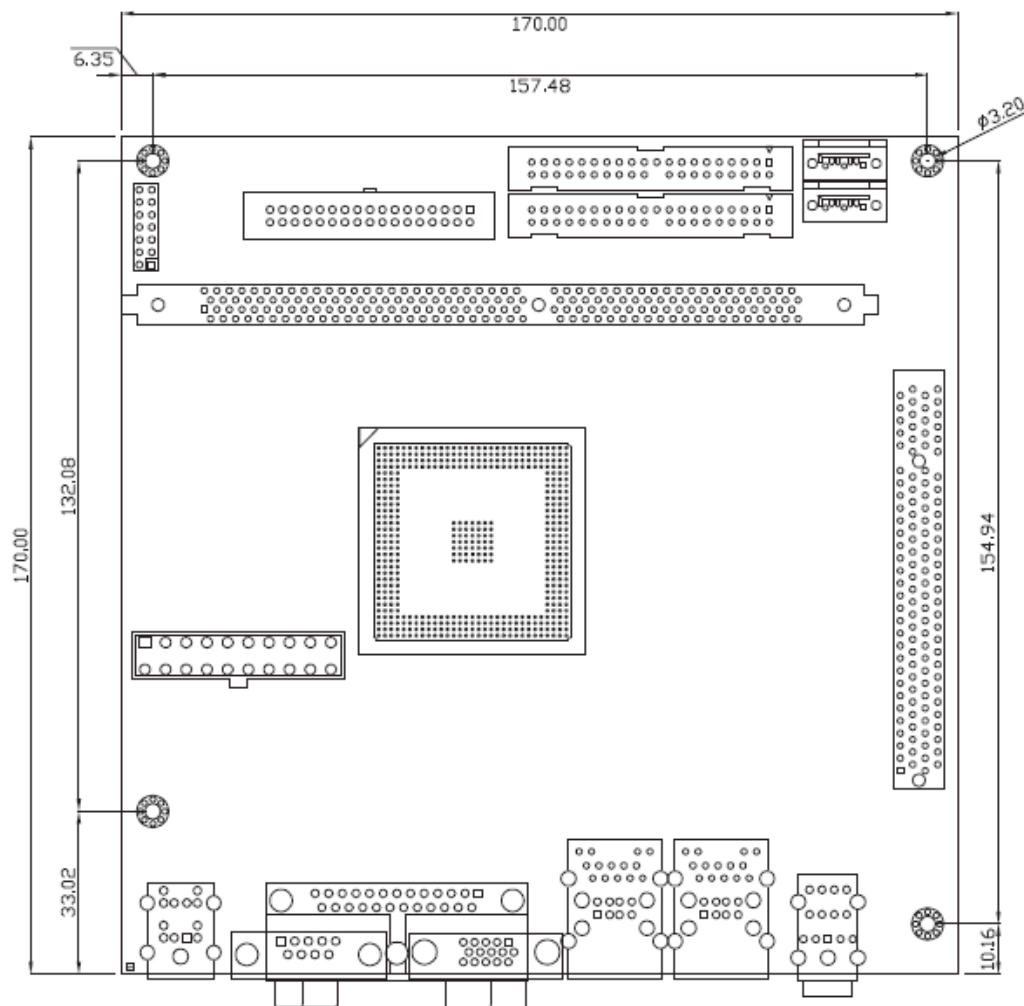
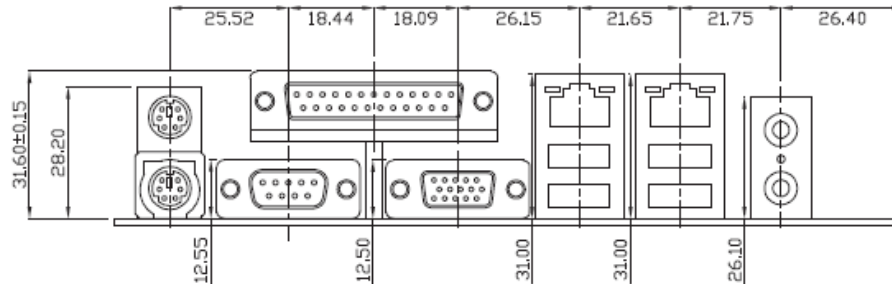


Figure 2-1: KINO-LX Dimensions (mm)



## 2.2.2 External Interface Panel Dimensions

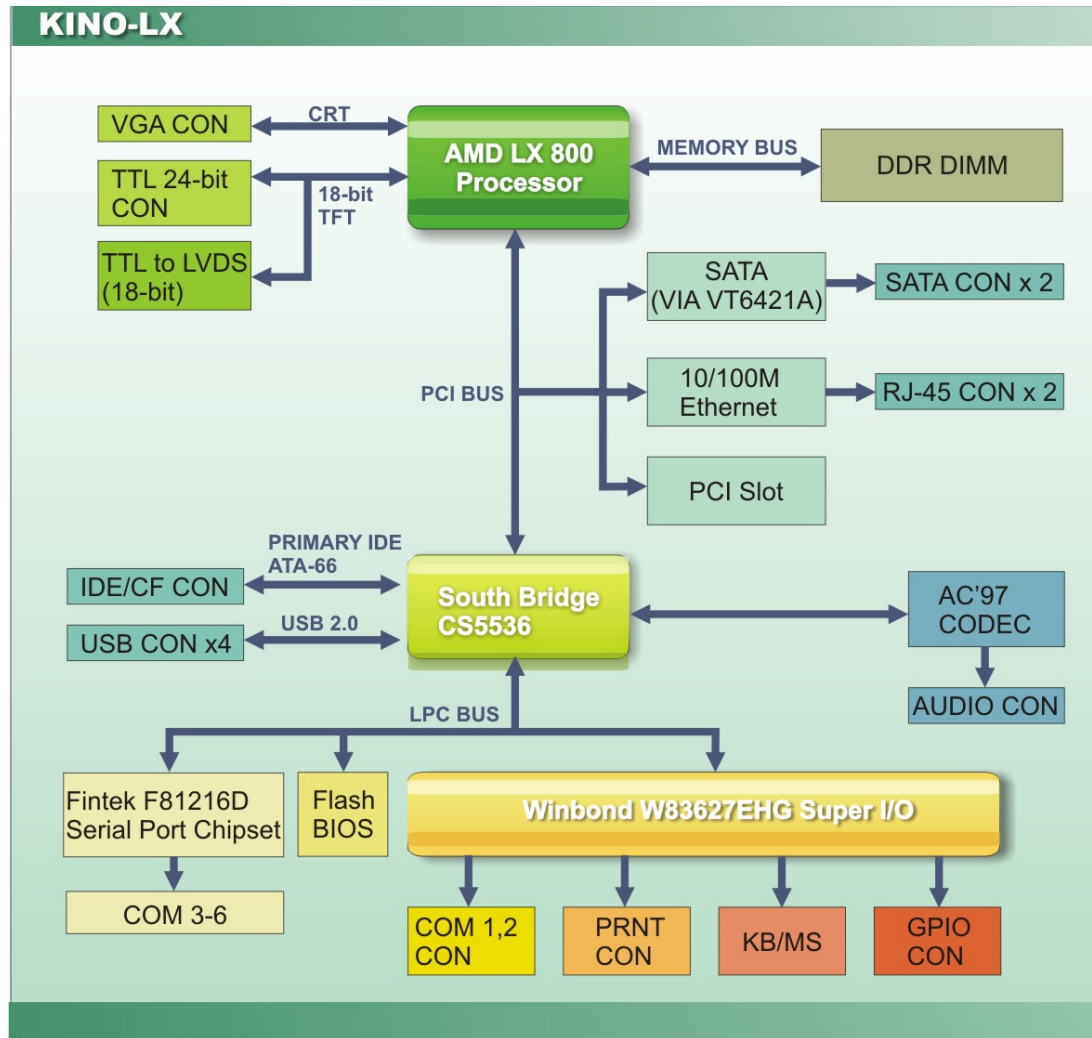
External peripheral interface connector panel dimensions are shown in **Figure 2-2**.



**Figure 2-2: External Interface Panel Dimensions (mm)**

## 2.3 Data Flow

The KINO-LX motherboard comes with an AMD Geode™ LX 800 CPU and an AMD Geode™ CS5536 linked together by the GeodeLink™ Interface Unit. **Figure 2-3** shows the data flow between the system chipset, the CPU and other components installed on the motherboard.



**Figure 2-3: Data Flow Block Diagram**

## 2.4 CPU Support

The KINO-LX series motherboards all come with a preinstalled 500 MHz AMD Geode™ LX 800 CPU.

### 2.4.1 AMD Geode™ LX 800 500MHz Overview

The specifications for the 500 MHz AMD Geode™ LX 800 are listed below

- x86/x87-compatible core
- Processor frequency up to 500 MHz
- 64K I/64K D L1 cache and 128K L2 cache

## KINO-LX Mini-ITX SBC

- Split I/D cache/TLB (Translation Look-Aside Buffer)
- Integrated FPU that supports the Intel MMX® and AMD 3DNow!™ Technology instruction sets
- 9 GB/s internal GeodeLink™ Interface Unit (GLIU)
- Security Block
  - 128-bit AES (CBC/ECB)
- True Random Number Generator

### 2.4.2 AMD Geode™ LX 800 Memory Support

The AMD Geode™ LX 800 supports 64-bit DDR memory modules with frequencies up to 333 MHz. The KINO-LX has one 184-pin DDR DIMM SDRAM socket that supports one 64-bit 333 MHz DDR DIMM memory module with a maximum capacity of 1GB.

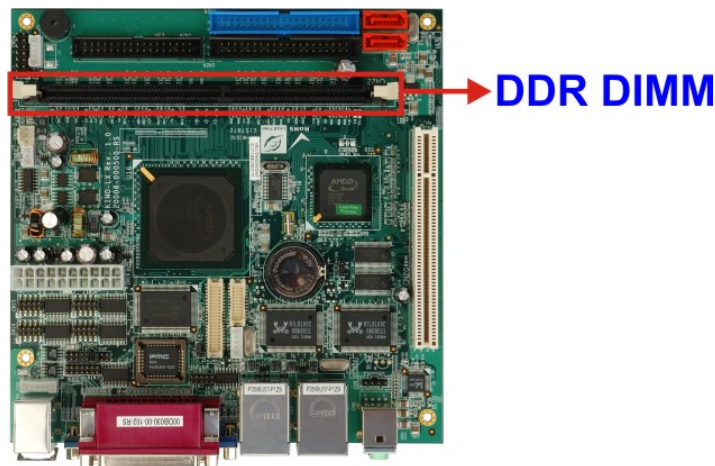


Figure 2-4: Memory Support

### 2.4.3 AMD Geode™ LX 800 500 MHz Display Support

The AMD Geode™ LX 800 supports CRT, 24-bit TTL and 18-bit single channel LVDS. The following display specifications.

- Supported Standards
  - High Definition (HD)
  - Standard Definition (SD)
- Supported Resolution
  - 1920x1440 in CRT mode

- 1600x1200 in TFT mode
- VESA 1.1 and 2.0 VIP/VDA support

#### 2.4.4 AMD Geode™ LX 800 500 MHz Graphics processor

The AMD Geode™ LX 800 BitBLT/vector engine graphics processor supports pattern generation, source expansion, pattern/source transparency, 256 ternary raster operations, alpha blenders to support alpha- BLTs, incorporated BLT FIFOs, a GeodeLink interface and the ability to throttle BLTs according to video timing. New features added to the Graphics Processor include:

- Command buffer interface
- Hardware accelerated rotation BLTs
- Color depth conversion
- Paletized color
- Full 8x8 color pattern buffer
- Separate base addresses for all channels
- Monochrome inversion

**Table 2-1: Geode LX Graphics Features** lists a complete list of Geode LX graphics features. For more details, please refer to the AMD website or the Geode LX series data book available from AMD.

Feature	AMD Geode™ LX Processor
Color Depth	8, 16, 32 bpp (A) RGB 4 and 8-bit indexed
ROPs	256 (2-src, dest and pattern)
BLT Buffers	FIFOs in Graphics Processor
BLT Splitting	Managed by hardware
Video Synchronized BLT/Vector	Throttle by VBLANK
Bresenham Lines	Yes
Patterned (stippled) Lines	Yes
Screen to Screen BLT	Yes
Screen to Screen BLT with mono expansion	Yes
Memory to Screen BLT	Yes (throttled rep movs writes)
Accelerated Text	No
Pattern Size (Mono)	8x8 pixels



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Pattern Size (Color)	8x8 pixels
Monochrome Pattern	Yes (with inversion)
Dithered Pattern (4 color)	No
Color Pattern	8, 16, 32 bpp
Transparent Pattern	Monochrome
Solid Fill	Yes
Pattern Fill	Yes
Transparent Source	Monochrome
Color Key Source Transparency	Y with mask
Variable Source Stride	Yes
Variable Destination Stride	Yes
Destination Write Bursting	Yes
Selectable BLT Direction	Vertical and Horizontal
Alpha BLT	Yes (constant $\alpha$ , $\alpha/\text{pix}$ , or sep. $\alpha$ channel)
VGA Support	Decodes VGA Register
Pipeline Depth	Unlimited
Accelerated Rotation BLT	8, 16, 32 bpp
Color Depth Conversion	5:6:5, 1:5:5:5, 4:4:4:4, 8:8:8:8

**Table 2-1: Geode LX Graphics Features**

### 2.4.5 AMD Geode™ LX 800 500 MHz Power Management

The power management for the 500 MHz AMD Geode™ LX 800 is listed below:

- 1.8W Typical (3.9W TDP) @ 500MHz
- GeodeLink active hardware power management
- Hardware support for standard ACPI software power management
- I/O companion SUSP#/SUSPA# power controls
- Lower power I/O
- Wakeup on SMI/INTR

## 2.5 System Chipset

The KINO-LX series motherboards all have a preinstalled AMD Geode™ CS5536 system chipset. The system chipset features are listed below.

- 82xx Legacy Devices
- System Management Bus (SMB) Controller
- 8 Multi-Function General Purpose Timers (MFGPTs)
- Power Management Controller
- ACPI v2.0 compliant

### 2.5.1 GeodeLink™ Interface Unit

- 64-bit, 66MHz operation
- PCI VSM (Virtual System Module) that makes the interface transparent to applications software and BIOS
- Programmable routing descriptors, use and activity monitors, and SSMI (Synchronous System Management Interrupt)

### 2.5.2 AMD Geode™ CS5536 ATA-6 Controller

The single KINO-LX IDE connector supports two ATA-6 HDDs. An ATA-6 (Ultra ATA/100) compliant IDE controller on the AMD Geode™ CS5536 has a maximum transfer rate of 100MB/s. ATA-6 includes advancements in error checking and ATA-6 drives are compatible with future interface additions.

The onboard ATA-6 controller is able to support the following IDE HDDs:

- **Ultra ATA/100**, with data transfer rates up to 100MB/s
- **Ultra ATA/66**, with data transfer rates up to 66MB/s
- **Ultra ATA/33**, with data transfer rates up to 33MB/s

Specification	Ultra ATA/100	Ultra ATA/66	Ultra ATA/33
IDE devices	2	2	2
PIO Mode	0 – 4	0 – 4	0 – 4
PIO Max Transfer Rate	16.6 MB/s	16.6 MB/s	16.6 MB/s
DMA/UDMA designation	UDMA 3 - 4	UDMA 3 – 4	UDMA 2
DMA/UDMA Max Transfer	100MB/s	66MB/s	33MB/s

**KINO-LX Mini-ITX SBC**

<b>Controller Interface</b>	5V	5V	5V
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**Table 2-2: Supported HDD Specifications****2.5.3 AMD Geode™ CS5536 Audio Codec 97 (AC'97) Controller**

The AC'97 specification v2.3 compliant controller on the chipset is interfaced to a 20-bit DAC and 18-bit ADC full-duplex AC'97 2.3 stereo RealTek ALC203 codec. The ALC203 is then connected to a 10-pin audio connector to which an audio kit can easily be connected. The codec meets performance requirements for audio on PC99/2001 systems. Some of the codec features are listed below.

- Meets Microsoft WHQL/WLP 2.0 audio requirements
- 20-bit DAC and 18-bit ADC resolution
- 18-bit Stereo full-duplex CODEC with independent and variable sampling rate
- Complies with AC'97 2.3 specifications
  - LINE/HP-OUT, MIC-IN and LINE-IN sensing
  - 14.318MHz -> 24.576MHz PLL saves crystal
  - 12.288MHz BITCLK input can be consumed
  - Integrated PCBEEP generator to save buzzer
  - Interrupt capability
  - Page registers and Analog Plug & Play
- Support of S/PDIF out is fully compliant with AC'97 rev2.3 specifications
- Three analog line-level stereo inputs with 5-bit volume control: LINE\_IN, CD, AUX
- High quality differential CD input
- Two analog line-level mono input: PCBEEP, PHONE-IN
- Supports double sampling rate (96KHz) of DVD audio playback
- Two software selectable MIC inputs
- +6/12/20/30dB boost preamplifier for MIC input
- Stereo output with 6-bit volume control
- Mono output with 5-bit volume control
- Headphone output with 50mW/20Ohm amplifier
- 3D Stereo Enhancement
- Multiple CODEC extension capability

- External Amplifier Power Down (EAPD) capability
- Power management and enhanced power saving features
- Stereo MIC record for AEC/BF application
- DC Voltage volume control
- Auxiliary power to support Power Off CD
- Adjustable VREFOUT control
- 2 GPIO pins with smart GPIO volume control
- 2 Universal Audio Jacks (UAJ)® for front panel
- Supports 32K/44.1K/48K/96KHz S/PDIF output
- Supports 32K/44.1K/48KHz S/PDIF input
- Power support: Digital: 3.3V; Analog: 3.3V/5V
- Standard 48-Pin LQFP Package
- EAX™ 1.0 & 2.0 compatible
- Direct Sound 3D™ compatible
- A3D™ compatible
- I3DL2 compatible
- HRTF 3D Positional Audio
- Sensaura™ 3D Enhancement (optional)
- 10 Bands of Software Equalizer
- Voice Cancellation and Key Shifting in Karaoke mode
- AVRack® Media Player

#### **2.5.4 AMD Geode™ CS5536 USB Controller**

Four external USB ports on the KINO-LX board are interfaced to the chipset USB controller. Four USB 1.1 or USB 2.0 devices can be connected simultaneously to the KINO-LX. The chipset USB controller has the following specifications:

- 4 USB ports
- USB 1.1 and USB 2.0 compliant
- 3 host ports
- 1 host/device

#### **2.5.5 AMD Geode™ CS5536 Real Time Clock**

The system chipset has a battery backed up 256-byte real-time clock (RTC) with CMOS RAM.



## 2.6 GeodeLink™ PCI Bridge

### 2.6.1 Overview

The GeodeLink™ PCI Bridge (GLPCI) module provides a PCI interface for GeodeLink Interface Unit-based designs. The GLPCI module is composed of six major blocks:

- GeodeLink Interface
- FIFO/Synchronization
- Transaction Forwarding
- PCI Bus Interface
- PCI Arbiter

The GeodeLink and PCI Bus Interface blocks provide adaptation to the respective buses. The Transaction Forwarding block provides bridging logic. Some of the features of the GeodeLink™ PCI Bridge are listed below:

- PCI Version 2.2 compliance
- 32-bit, 66 MHz PCI bus operation
- Target support for fast back-to-back transactions
- Arbiter support for three external PCI bus masters
- Write gathering and write posting for in-bound write requests
- Virtual PCI header support
- Delayed transactions for in-bound read requests
- Zero wait state operation within a PCI burst
- Dynamic clock stop/start support for GLIU and PCI clock domains (this is not CLKRUN support)
- Capable of handling out of bound transactions immediately after reset

The PCI bus is connected to the components listed below:

- Two RealTek RTL8100C 10/100M Ethernet controllers
- One VIA VT6421A serial RAID controller
- One PCI slot

## 2.6.2 10/100M Ethernet

A highly integrated and cost-effective single-chip, fast RealTek RTL8100C 10/100M Ethernet controller is interfaced through first the PCI bus and then through the GeodeLink™ PCI Bridge to the CPU and system chipset. The RealTek RTL8100C controller provides 10 Mbps or 100 Mbps Ethernet connectivity to the KINO-LX. Some of the features of the RealTek RTL8100C are listed below.

- 10Mbps and 100Mbps operation
- Supports 10Mbps and 100Mbps N-way auto-negotiation
- Supports 25MHz Crystal or 25MHz OSC as the internal clock source
- Complies with PC99/PC2001 standards
- Supports ACPI power management
- Provides PCI bus master data transfer
- Provides PCI memory space or I/O space mapped data transfer
- Supports PCI clock speed of 16.75MHz-40MHz
- Advanced power saving mode
- Supports Wake-on-LAN and remote wake-up (AMD Magic Packet™, Link Change, and Microsoft® Wake-up frame)
- Half/Full duplex capability
- Supports Full Duplex Flow Control (IEEE 802.3x)
- Provides interface to 93C46 EEPROM to store resource configuration and ID parameters
- Provides PCI clock run pin
- Provides LED pins for network operation status indication
- 2.5/3.3V power supply with 5V tolerant I/Os

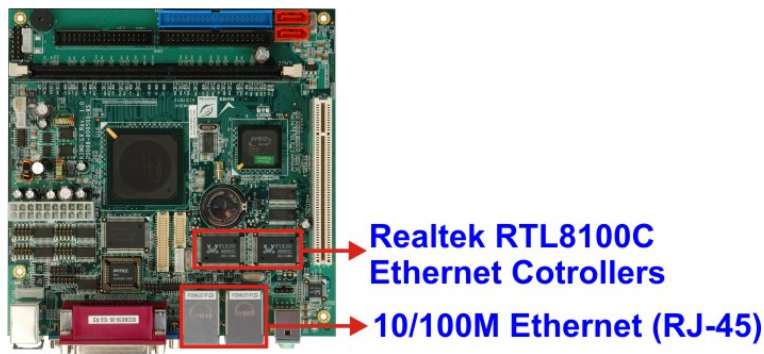


Figure 2-5: 10/100M Ethernet Controllers and Connectors

## KINO-LX Mini-ITX SBC

### 2.6.3 VIA VT6421A Serial RAID Controller

A VIA VT6421A serial RAID controller connects two onboard KINO-LX SATA connectors to the GeodeLink™ PCI bridge. The VT6421A has a PCI specification v2.2 compliant PCI bus interface and supports both PCI 2X mode and PCI native mode. Some of the features of the VT6421A serial RAID controller are listed below.

- Supports RAID Level 0, RAID Level 1 and JBOD
- PCI Interface
  - 33 MHz operation
  - Supports PCI 2X mode and PCI native modes
  - Complies with PCI Local Bus Specification Revision 2.2
- Serial ATA Interface
  - Complies with Serial ATA Specification Revision 1.0
  - Supports internal PHY with each PHY supporting up to two SATA devices
  - Dual-channel master mode PCI supporting up to two SATA devices
  - Support data transfer rates of up to 150Mbps per SATA channel

## 2.7 LPC Bus Components

### 2.7.1 LPC Bus Overview

The LPC bus is connected to components listed below:

- BIOS chipset
- Winbond W83627EHG super I/O chipset
- Fintek F81216DG LPC serial port chipset

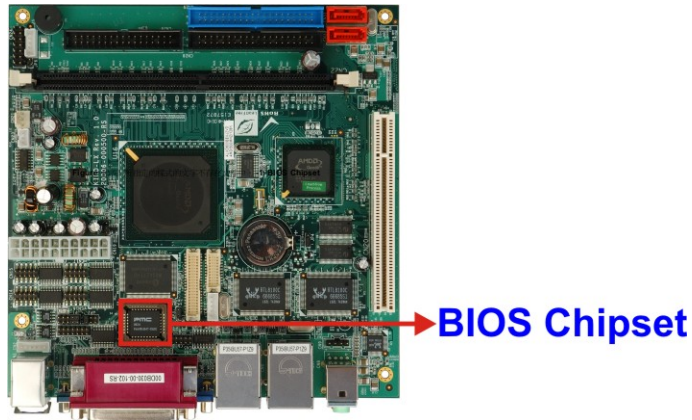
### 2.7.2 BIOS Chipset

The BIOS chipset has a licensed copy of AWARD BIOS installed on the chipset. Some of the BIOS features are listed below:

- AWARD Flash BIOS
- SMIBIOS (DMI) compliant
- Console redirection function support
- PXE (Pre-boot Execution Environment) support

- USB booting support

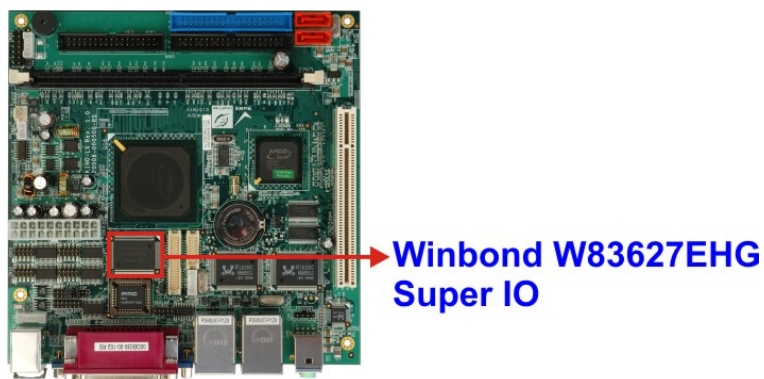
The BIOS chipset is shown in **Figure 2-6** below.



**Figure 2-6: BIOS Chipset**

### 2.7.3 Winbond W83627EHG Super I/O chipset

The Winbond W83627EHG Super I/O chipset is connected to the AMD CS5536 Southbridge through the LPC bus.



**Figure 2-7: Super I/O Chipset**

The Winbond W83627EHG is an LPC interface-based Super I/O device that comes with Environment Controller integration, floppy disk controller, UART controller and IR controller. Some of the features of the Winbond W83697EHG chipset are listed below:

- LPC Spec. 1.01 compliant
- LDRQ# (LPC DMA) and SERIRQ (serial IRQ) supported



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- Hardware monitor functions integrated
- Microsoft PC98/PC99 Hardware Design Guide compliant
- ACPI DPM (Device Power Management) supported

Some of the Super I/O features are described in more detail below:

### 2.7.3.1 Super I/O LPC Interface

The LPC interface on the Super I/O complies with the Intel<sup>®</sup> Low Pin Count Specification Rev. 1.01. The LPC interface supports both LDRQ# and SERIRQ protocols as well as PCI PME# interfaces.

### 2.7.3.2 Super I/O UART Controller

There are two high-speed 16550 compatible UART controllers integrated onto the Super I/O chipset. Both controllers have 16-byte send/receive FIFO. Some of the features of the UART controllers are listed below:

- MIDI compatible
- Fully programmable serial-interface characteristics:
  - 5, 6, 7, or 8-bit characters
  - Even, odd or no parity bit generation/detection
  - 1, 1.5 or 2 stop bits generation
- Internal diagnostic capabilities:
  - Loop-back control for communications link fault isolation
  - Break, parity, overrun, framing error stimulation
- Programmable baud generator allows division of 1.8461 MHz and 24 MHz by 1 to ( $2^{16} - 1$ )
- Maximum baud rate up to 921 kbps for 14.769 MHz and 1.5 Mbps for 24 MHz

The two UART serial port controllers are interface to two serial port connectors, one RS-232 and one that can be configured as RS-232, RS-422 or RS-485. Four additional RS-232 serial ports are interface through the Fintek F81216DG LPC serial port chipset (refer to **Section 2.7.4**).

### 2.7.3.3 Super I/O Infrared

The onboard Super I/O supports the following infrared specifications:

- IrDA version 1.0 SIR protocol with a maximum baud rate up to 115.2Kbps
- The IR controller on the super I/O is interfaced through the board-to-board connectors on the KINO-LX to an IrDA pin-header on a backplane.

#### 2.7.3.4 Super I/O Hardware Monitor Functions

The Super I/O Hardware Monitor monitors internal voltages, system temperature and the cooling fan speed. All the monitored environmental parameters can be read from the BIOS Hardware Health Configuration menu.

#### 2.7.3.5 Super I/O Parallel Port

The Super I/O parallel port (LPT) is compatible with the following LPT specifications.

- IBM parallel port compatible
- PS/2 compatible bi-directional parallel port
- Enhanced Parallel Port (EPP) mode supported. Compatible with IEEE 1284 specifications
- Extended Parallel Port (EPP) mode supported. Compatible with IEEE 1284 specifications
- Enhanced printer port back-drive current protection

The parallel port controller is connected to an external DB-26 LPT connector.

#### 2.7.3.6 Super I/O Floppy Disk Drive (FDD) Controller

The Super I/O FDD controller is compatible with the following specifications.

- IBM PC AT disk drive compatible
- Variable write pre-compensation with track selectable capability
- Vertical recording format supported
- DMA logic enabled
- 16-byte data FIFOs
- Overrun and under run conditions detected
- Built-in address mark detection circuitry to simplify the read electronics
- FDD anti-virus functions with software write protect and FDD write enable signal
- Supports 3.5-inch or 5.25-inch FDD

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- Compatible with industry standard 82077
- Supported capacities:
  - 360K
  - 720K
  - 1.2M
  - 1.44M
  - 2.88M
- Supported transfer rates
  - 250Kbps
  - 300Kbps
  - 500Kbps
  - 1Mbps
  - 2Mbps
- 3-mode FDD supported

The FDD controller is interfaced to a FDD connected to the motherboard through the onboard connector.

### 2.7.3.7 Super I/O Keyboard and Mouse Controller

The Super I/O keyboard and mouse controller is compatible with the following specifications.

- 8042 compatible
- Asynchronous access to two data registers and one status register
- Compatible with 8042 software
- PS/2 mouse supported
- Port 92 supported
- Interrupt and polling modes supported
- Fast Gate A20 and Hardware Keyboard Reset
- 8-bit timer/counter

The keyboard and mouse controller is interfaced to a keyboard and mouse connected to the motherboard through the onboard connector or the external connectors.

### 2.7.3.8 Super I/O GPIO Ports

The Super I/O has 22 programmable GPIO ports of which 8 are implemented on the KINO-LX. The GPIO connector has 8 programmable bits, 4-bit input and 4-bit output.

### 2.7.3.9 Super I/O Fan Speed and Fan Control

The super I/O can both monitor and control the fan speed. The super I/O is interfaced to the fan on the motherboard through the onboard connectors.

## 2.7.4 Fintek F81216DG LPC Serial Port Chipset

The Fintek F81216DG chipset enables the addition of four additional UART serial ports (COM3, COM4, COM5 and COM6). UART includes 16-byte send/receive FIFO. The Fintek serial port chipset is interfaced to the Southbridge chipset through the LPC bus. Some of the features of the Fintek chipset are listed below:

- Supports LPC interface
- Totally provides 4 UART (16550 asynchronous) ports
  - 3 x Pure UART
  - 1 x UART+IR
- One Watch dog timer with WDTOUT# signal
- One Frequency input 24/48MHz
- Powered by 3Vcc

## 2.8 Environmental and Power Specifications

### 2.8.1 System Monitoring

The KINO-LX is capable of self-monitoring various aspects of its operating status including:

- CPU, chipset, and battery voltage, +3.3V, +5V, and +12V
- RPM of cooling fans
- CPU and board temperatures (by the corresponding embedded sensors)

### 2.8.2 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the KINO-LX are listed below.

## KINO-LX Mini-ITX SBC

- Minimum Operating Temperature: 0°C (32°F)
- Maximum Operating Temperature: 60°C (140°F)

A cooling fan and heat sink must be installed on the CPU. Thermal paste must be smeared on the lower side of the heat sink before it is mounted on the CPU. Heat sinks are also mounted on the Northbridge and Southbridge chipsets to ensure the operating temperature of these chips remain low.

### 2.8.3 Power Consumption

**Table 2-3** shows the power consumption parameters for the KINO-LX when an AMD Geode™ LX 800 processor is running with one 333 MHz 512 MB-HCT DDR memory module.

Voltage	Current
+5V	1.45A

**Table 2-3: Power Consumption**



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Chapter

3

# Unpacking

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## 3.1 Anti-static Precautions



### WARNING:

Failure to take ESD precautions during the installation of the KINO-LX may result in permanent damage to the KINO-LX and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the KINO-LX. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the KINO-LX, or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband:*** Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding:*** Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad:*** When configuring the KINO-LX, place it on an anti-static pad. This reduces the possibility of ESD damaging the KINO-LX.
- ***Only handle the edges of the PCB:*** When handling the PCB, hold the PCB by the edges.

## 3.2 Unpacking

### 3.2.1 Unpacking Precautions

When the KINO-LX is unpacked, please do the following:

- Follow the anti-static precautions outlined in **Section 3.1**.
- Make sure the packing box is facing upwards so the KINO-LX does not fall out of the box.
- Make sure all the components shown in **Section 3.3** are present.

## KINO-LX Mini-ITX SBC

### 3.3 Unpacking Checklist








#### NOTE:





If some of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the KINO-LX from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to [sales@iei.com.tw](mailto:sales@iei.com.tw).

#### 3.3.1 Package Contents

The KINO-LX is shipped with the following components:



Quantity	Item and Part Number	Image
1	KINO-LX SBC	
1	IDE flat cable (P/N: 32200-000052-RS)	
2	RS-232 cables (P/N: 32200-028401-RS)	
2	SATA cables (P/N: 32000-062800-RS)	
1	SATA power cable (P/N: 32100-088600-RS)	



1	I/O Shielding (P/N: 45002-451603-00-RS)	
1	Mini jumper pack	
1	Quick Installation Guide	
1	Utility CD	

**Table 3-1: Package List Contents**

### 3.4 Optional Items

FDD cable (P/N: 32200-000017-RS)	
RS-232 and RS-422/485 cable (P/N: 32200-000077-RS)	
KINO-LX-CE050	Windows CE 5.0 & BSP, Software CD, Licensed sticker
KINO-LX-XPE	Windows XP Embedded & SLD, software CD, Licensed sticker

**Table 3-2: Package List Contents**

Chapter

4

# Connectors and Jumpers

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## 4.1 Peripheral Interface Connectors

Section 4.1.1 shows peripheral interface connector locations. Section 4.1.2 lists all the peripheral interface connectors seen in Section 4.1.1.

### 4.1.1 KINO-LX Layout

Figure 4-1 shows the on-board peripheral connectors and on-board jumpers.

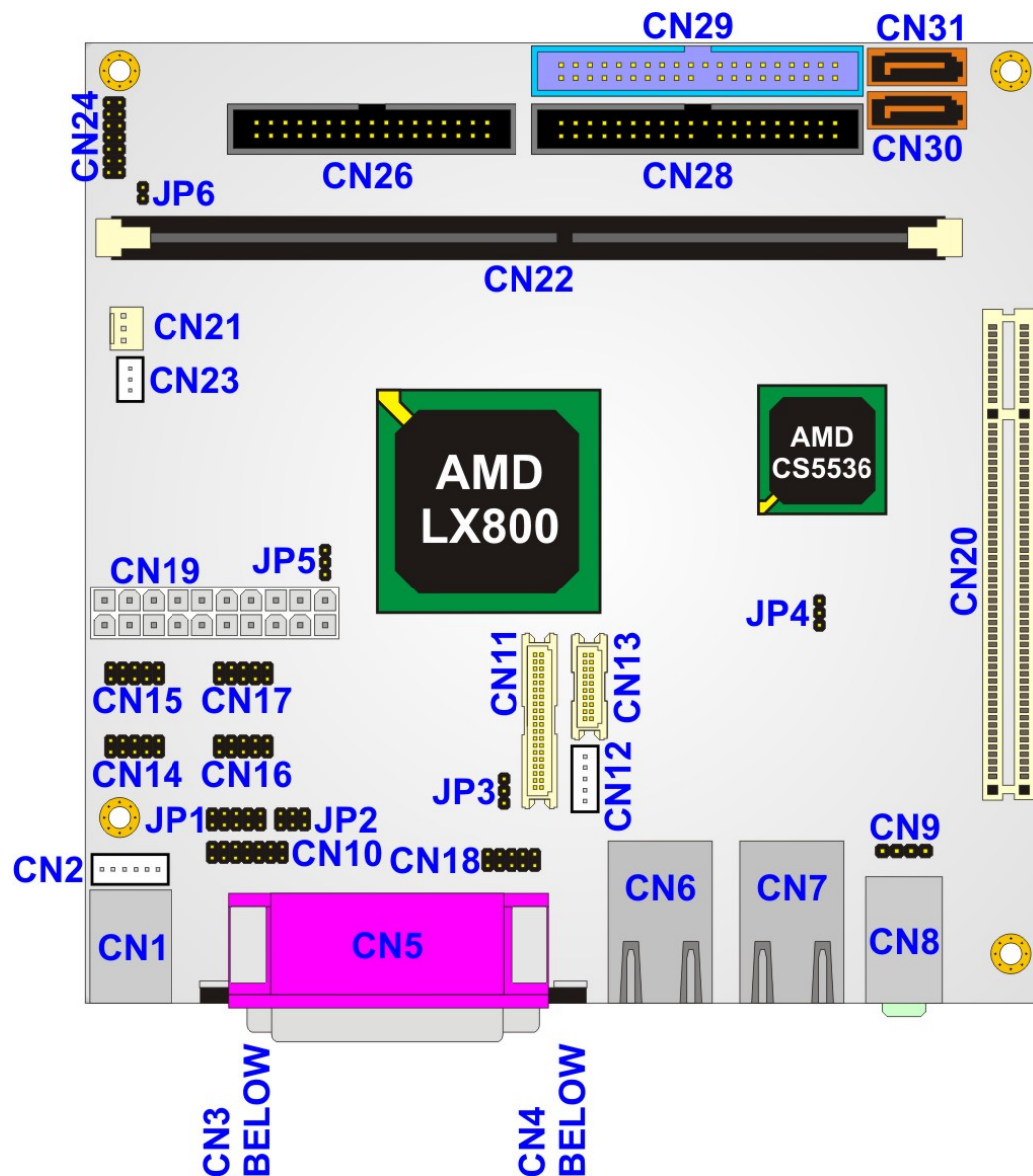


Figure 4-1: Connector and Jumper Locations

## KINO-LX Mini-ITX SBC

### 4.1.2 Peripheral Interface Connectors

**Table 3-1** shows a list of the peripheral interface connectors on the KINO-LX. Detailed descriptions of these connectors can be found in **Section 3.2**.

Connector	Type	Label
AT/ATX power connector	20-pin header	CN19
CD-IN connector	4-pin header	CN9
CompactFlash® slot (solder side)	50-pin socket	CN32
DIMM socket	184-pin socket	CN22
5V Fan connector	3-pin box header	CN23
12V Fan connector	3-pin header	CN21
FDD connector	34-pin box header	CN26
Front Panel connector	14-pin header	CN24
GPIO connector	10-pin header	CN18
IDE Interface connector (Primary)	40-pin box header	CN29
IDE Interface connector (Secondary)	40-pin box header	CN28
Inverter Power connector	5-pin wafer connector	CN12
Keyboard/Mouse connector	6-pin wafer connector	CN2
LCD TTL connector	40-pin crimp connector	CN11
LCD LVDS connector	20-pin crimp connector	CN13
PCI slot	128-pin PCI slot	CN20
RS-232/485 COM-2 serial port connector	14-pin header	CN10
RS-232 COM-3 serial port connector	10-pin header	CN14
RS-232 COM-4 serial port connector	10-pin header	CN15
RS-232 COM-5 serial port connector	10-pin header	CN16



RS-232 COM-6 serial port connector	10-pin header	CN17
SATA-1 drive connector	7-pin SATA connector	CN30
SATA-2 drive connector	7-pin SATA connector	CN31

**Table 4-1: Peripheral Interface Connectors**

### 4.1.3 External Peripheral Interface Connectors

**Table 4-2** lists the external peripheral interface connectors on the KINO-LX. Detailed descriptions of these connectors can be found in **Section 4.3**.

Connector	Type	Label
Audio connector	2 x audio jacks	CN8
Ethernet and USB combo connector	RJ-45 and USB 2.0 connectors	CN6
Ethernet and USB combo connector	RJ-45 and USB 2.0 connectors	CN7
Keyboard/mouse connector	Dual PS/2 connector	CN1
Parallel port	DB-25 female connector	CN5
RS-232 serial port connector	D-sub 9 male connector	CN3
VGA connector	HD-D-sub 15 female connector	CN4

**Table 4-2: Rear Panel Connectors**

## 4.2 Internal Peripheral Connectors

Internal peripheral connectors are found on the motherboard and are only accessible when the motherboard is outside of the chassis. This section has complete descriptions of all the internal peripheral connectors on the KINO-LX.

### 4.2.1 AT/ATX Power Connector

**CN Label:** CN19

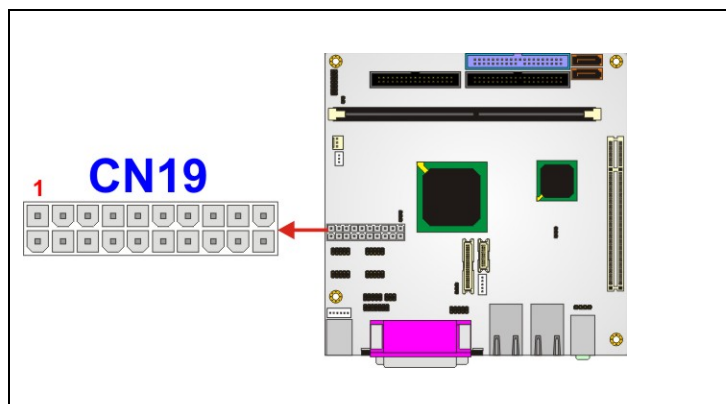
**CN Type:** 20-pin connector

## KINO-LX Mini-ITX SBC

**CN Location:** See Figure 4-2

**CN Pinouts:** See Table 4-3

The ATX Power connector is connected to an ATX or AT power supply.



**Figure 4-2: AT/ATX Power Connector Pinouts**

PIN	DESCRIPTION	PIN	DESCRIPTION
11	NC	1	NC
12	-12V	2	NC
13	GND	3	GND
14	PSON	4	+5V
15	GND	5	GND
16	GND	6	+5V
17	GND	7	GND
18	NC	8	PW-OK
19	+5V	9	+5VSB
20	+5V	10	+12V

**Table 4-3: AT/ATX Power Connector Pinouts**

### 4.2.2 CD-IN Connector

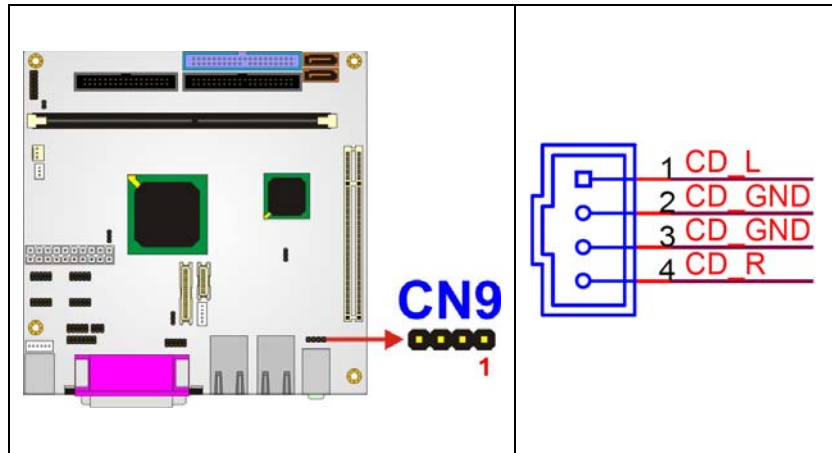
**CN Label:** CN9

**CN Type:** 4-pin header

**CN Location:** See Figure 4-3

**CN Pinouts:** See **Table 4-4**

The CD-In connector connects to audio sources such as CD/DVD-ROM optical drives.



**Figure 4-3: CD-IN Connector Pinout Locations**

PIN	DESCRIPTION
1	CD-L
2	GND
3	GND
4	CD-R

**Table 4-4: CD-IN Connector Pinouts**

### 4.2.3 CompactFlash® Socket

**CN Label:** **CN32** (solder side)

**CN Type:** 50-pin header (2x25)

**CN Location:** See **Figure 4-4**

**CN Pinouts:** See **Table 4-5**

A CF Type I or Type II memory card is inserted to the CF socket on the solder side of the KINO-LX.

## KINO-LX Mini-ITX SBC

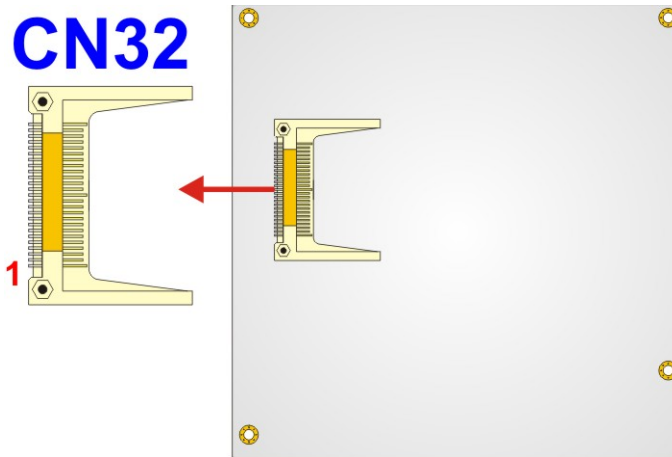


Figure 4-4: CF Card Socket Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GROUND	26	PULL DOWN
2	D3	27	D11
3	D4	28	D12
4	D5	29	D13
5	D6	30	D14
6	D7	31	D15
7	CS0#	32	CS1#
8	GROUND	33	NC
9	GROUND	34	IOR#
10	GROUND	35	IOW#
11	GROUND	36	PULL HIGH
12	GROUND	37	IIRQ15
13	VCC5	38	VCC
14	GROUND	39	SLAVE
15	GROUND	40	NC
16	GROUND	41	RESET#
17	GROUND	42	IORDY
18	A2	43	DRQ
19	A1	44	ACK
20	A0	45	ACTIVE#

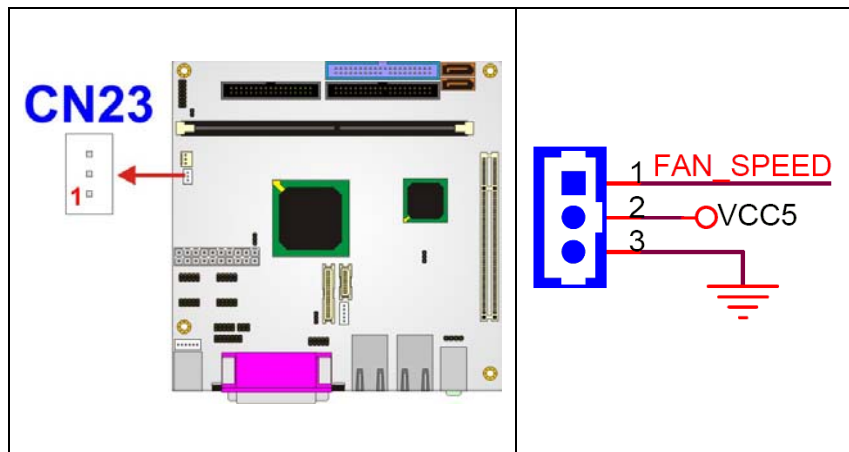
21	D0	46	PDIAG#
22	D1	47	D8
23	D2	48	D9
24	NC	49	D10
25	PULL DOWN	50	GROUND

**Table 4-5: CF Card Socket Pinouts**

#### 4.2.4 5V Fan Connector

- CN Label:** CN23
- CN Type:** 3-pin wafer
- CN Location:** See Figure 3-4
- CN Pinouts:** See Table 3-6

The cooling fan connector provides a 5V current to a system cooling fan. The connector has a "rotation" pin to get rotation signals from fans and notify the system so the system BIOS can recognize the fan speed. Please note that only specified fans can issue the rotation signals.



**Figure 4-5: 5V Fan Connector Pinout Locations**

PIN	DESCRIPTION
1	GND
2	+5V



## KINO-LX Mini-ITX SBC

3	Fan Speed Detect
---	------------------

Table 4-6: 5V Fan Connector Pinouts

### 4.2.5 12V Fan Connector

<b>CN Label:</b>	<b>CN21</b>
<b>CN Type:</b>	3-pin wafer
<b>CN Location:</b>	See <b>Figure 3-5</b>
<b>CN Pinouts:</b>	See <b>Table 3-7</b>

The cooling fan connector provides a 12V, 500mA current to a system cooling fan. The connector has a "rotation" pin to get rotation signals from fans and notify the system so the system BIOS can recognize the fan speed. Please note that only specified fans can issue the rotation signals.

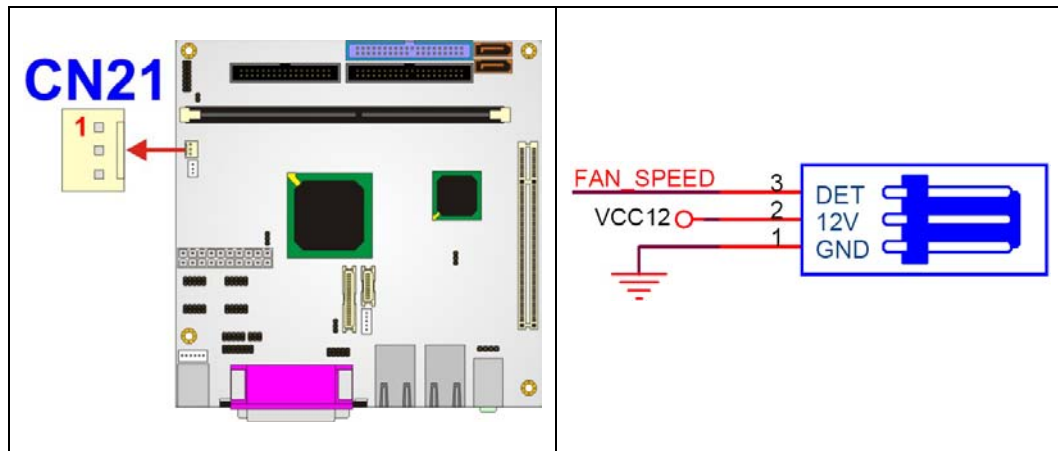


Figure 4-6: Fan Connector Pinout Locations

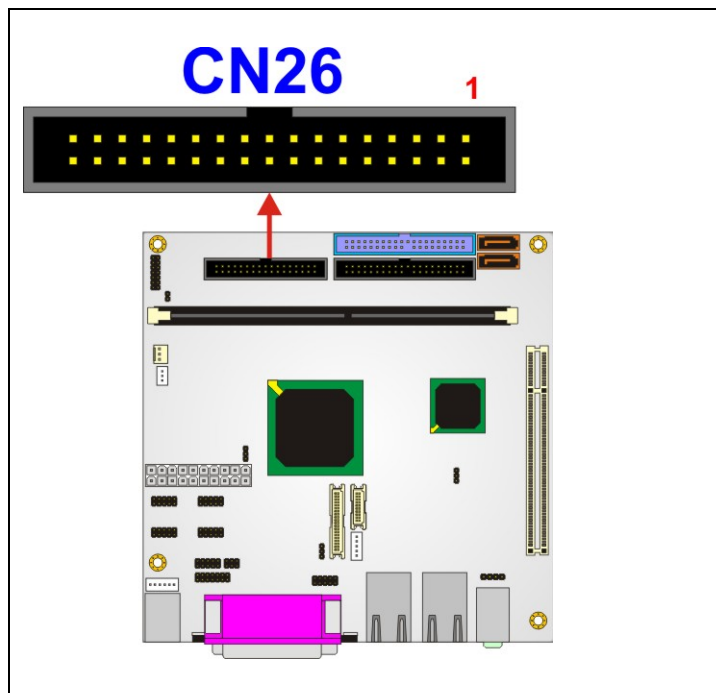
PIN	DESCRIPTION
1	GND
2	+12V
3	Fan Speed Detect

Table 4-7: Fan Connector Pinouts

#### 4.2.6 Floppy Disk Connector

<b>CN Label:</b>	<b>CN26</b>
<b>CN Type:</b>	34-pin box header
<b>CN Location:</b>	See <b>Figure 3-6</b>
<b>CN Pinouts:</b>	See <b>Table 3-8</b>

The floppy disk connector connects to a floppy disk drive.



## KINO-LX Mini-ITX SBC

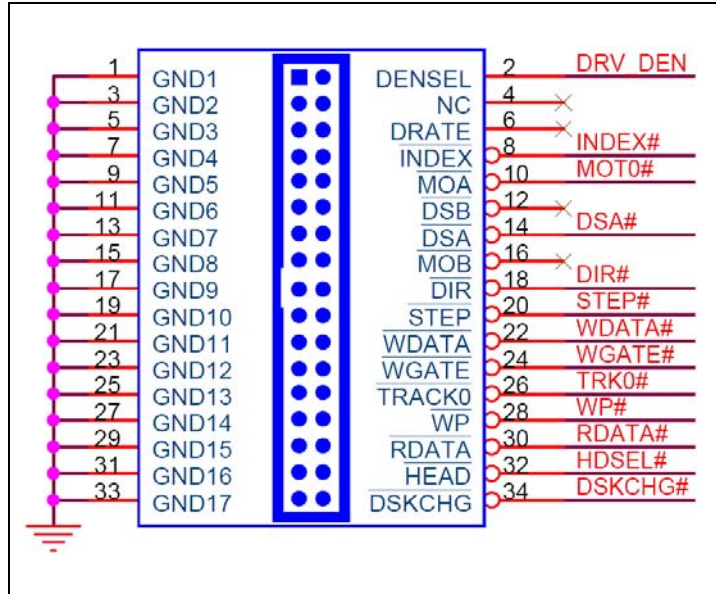


Figure 4-7: FDD Pinout Locations

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND	2	DENSEL
3	GND	4	NC
5	GND	6	NC
7	GND	8	INDEX#
9	GND	10	MOA#
11	GND	12	NC
13	GND	14	DSA#
15	GND	16	NC
17	GND	18	DIR#
19	GND	20	STEP#
21	GND	22	WDATA#
23	GND	24	WGATE#
25	GND	26	TRACK0#
27	GND	28	WP#
29	GND	30	RDATA#
31	GND	32	HEAD#
33	GND	34	DSKCHG#

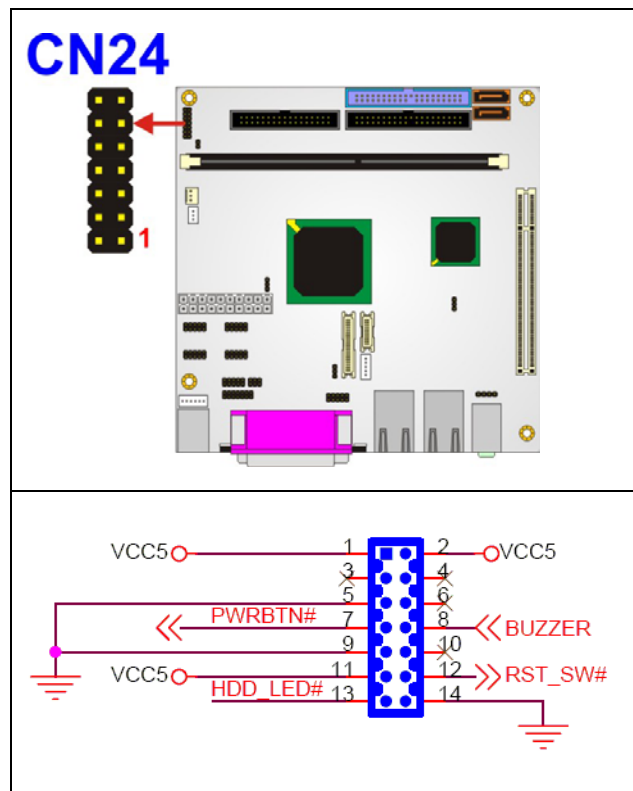
Table 4-8: FDD Connector Pinouts

### 4.2.7 Front Panel Connector

<b>CN Label:</b>	<b>CN24</b>
<b>CN Type:</b>	14-pin header (2x7 pins)
<b>CN Location:</b>	See <b>Figure 4-8</b>
<b>CN Pinouts:</b>	See <b>Table 4-9</b>

The front panel connector connects to several external switches and indicators to monitor and controls the motherboard. These indicators and switches include:

- Power button
- Reset button
- Speaker
- Power LED
- HDD LED



**Figure 4-8: Front Panel Connector Pinout Locations**

## KINO-LX Mini-ITX SBC

PIN	DESCRIPTION	PIN	DESCRIPTION
1	PWRLED+	2	Buzzer+ (+5V)
3	NC	4	NC
5	PWRLED-	6	NC
7	PWRBTN#	8	Buzzer-
9	GND	10	NC
11	HDDLED+	12	SYS_RST#
13	HDDLED-	14	GND

Table 4-9: Front Panel Connector Pinouts

### 4.2.8 GPIO Connector

- CN Label:** CN18
- CN Type:** 10-pin header (2x5 pins)
- CN Location:** See Figure 4-9
- CN Pinouts:** See Table 4-10

The General Purpose Input Output (GPIO) connector can be connected to external I/O control devices including sensors, lights, alarms and switches.

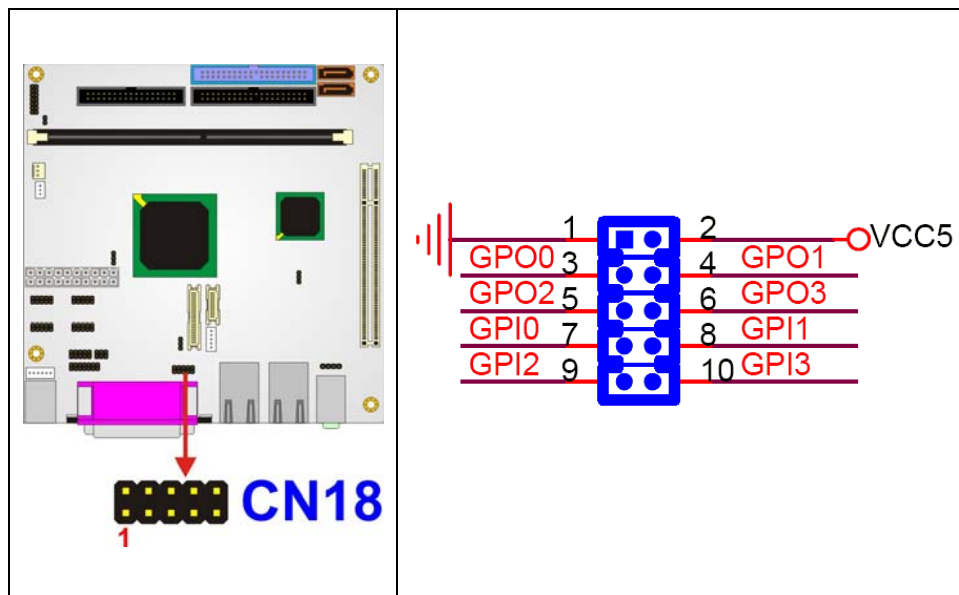


Figure 4-9: GPIO Connector Pinout Locations



PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND	2	+5V
3	GPO0	4	GPO1
5	GPO2	6	GPO3
7	GPI0	8	GPI 1
9	GPI 2	10	GPI 3

**Table 4-10: GPIO Connector Pinouts**

#### 4.2.9 IDE Connectors

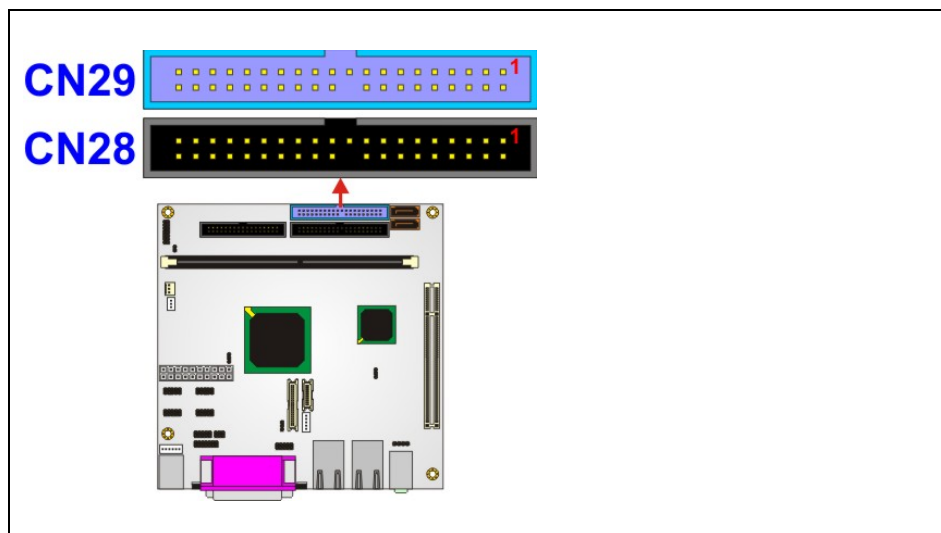
**CN Label:**           **CN29 (Primary) and CN28 (Secondary)**

**CN Type:**           40-pin header (2x20)

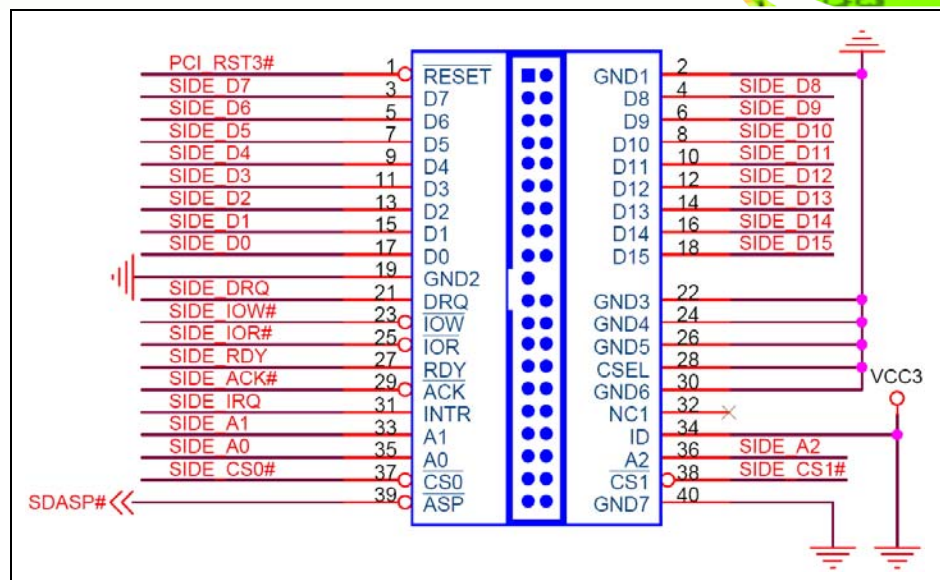
**CN Location:**      See **Figure 4-10**

**CN Pinouts:**        See **Table 4-11**

Two 40-pin IDE device connectors on the KINO-LX motherboard supports connectivity to Ultra ATA/133 IDE devices with data transfer rates up to 133MB/s.



## KINO-LX Mini-ITX SBC



**Figure 4-10: IDE Device Connector Locations**

PIN	DESCRIPTION	PIN	DESCRIPTION
1	RESET#	2	GND
3	D7	4	D8
5	D6	6	D9
7	D5	8	D10
9	D4	10	D11
11	D3	12	D12
13	D2	14	D13
15	D1	16	D14
17	D0	18	D15
19	GND	20	NC
21	DRQ	22	GND
23	IOW#	24	GND
25	IOR#	26	GND
27	RDY	28	NC
29	ACK#	30	GND
31	INT	32	NC
33	A1	34	CABLEID
35	A0	36	A2
37	CS0#	38	CS1#

PIN	DESCRIPTION	PIN	DESCRIPTION
39	ASP#	40	GND

**Table 4-11: IDE Connector Pinouts**

#### 4.2.10 Inverter Power Connector

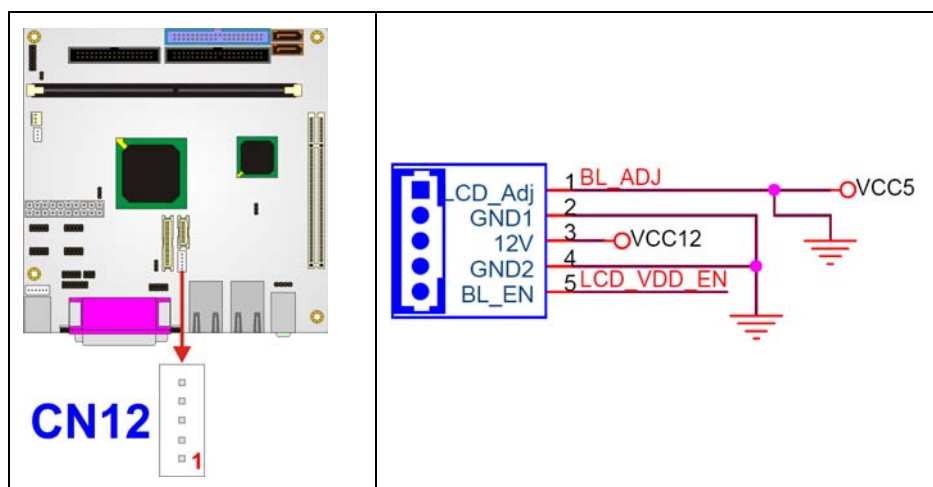
**CN Label:** CN12

**CN Type:** 5-pin wafer

**CN Location:** See **Figure 4-11**

**CN Pinouts:** See **Table 4-12**

The inverter connector is connected to the LCD backlight.



**Figure 4-11: Inverter Connector Locations**

PIN	DESCRIPTION
1	ADJ (Def : GND)
2	GND
3	+12V
4	GND
5	BL_EN

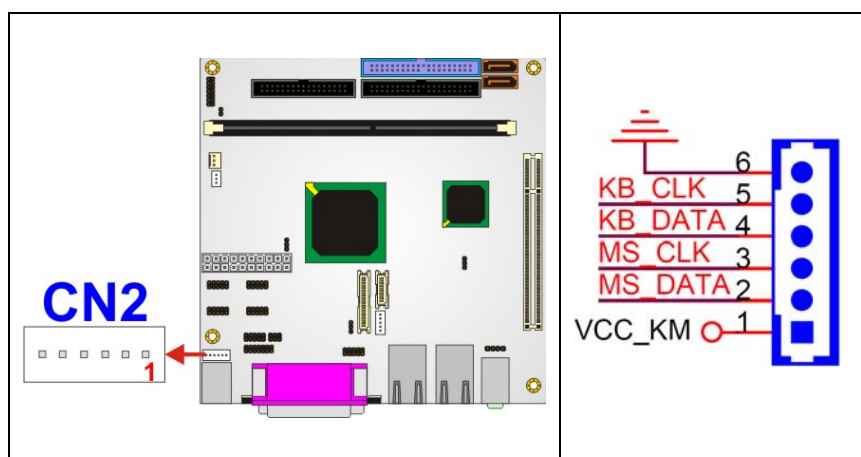
**Table 4-12: Inverter Power Connector Pinouts**

## KINO-LX Mini-ITX SBC

### 4.2.11 Keyboard/Mouse Connector

<b>CN Label:</b>	<b>CN2</b>
<b>CN Type:</b>	6-pin wafer
<b>CN Location:</b>	See <b>Figure 3-11</b>
<b>CN Pinouts:</b>	See <b>Table 3-13</b>

For alternative applications, an on board keyboard/mouse pin header connector is also available.



**Figure 4-12: Keyboard/Mouse Connector Location**

PIN	DESCRIPTION
1	+5V
2	MSDATA
3	MSCLK
4	KBDATA
5	KBCLK
6	GND

**Table 4-13: Keyboard/Mouse Connector Pinouts**

### 4.2.12 LCD LVDS Connector

<b>CN Label:</b>	<b>CN13</b>
------------------	-------------

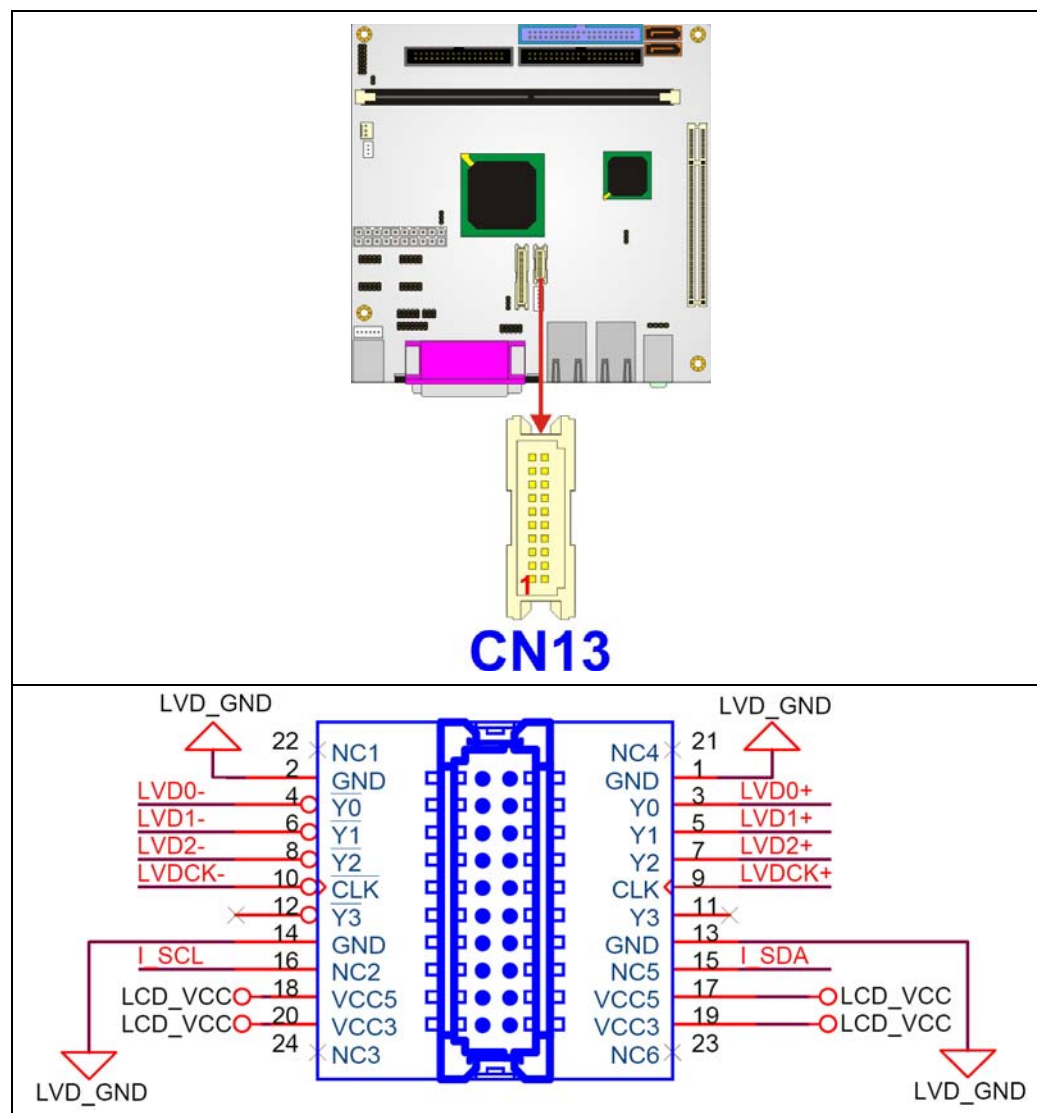


**CN Type:** 20-pin crimp connector

**CN Location:** See Figure 4-13

**CN Pinouts:** See Table 4-14

The LCD LVDS connector is connected to a LCD LVDS display device.



**Figure 4-13: LCD LVDS Connector Locations**



## KINO-LX Mini-ITX SBC

PIN	DESCRIPTION	PIN	DESCRIPTION
2	GND	1	GND
4	D0-	3	D0+
6	D1-	5	D1+
8	D2-	7	D2+
10	CLK-	9	CLK+
12	NC	11	NC
14	GND	13	GND
16	SCL	15	SDA
18	LCD_VCC	17	LCD_VCC
20	LCD_VCC	19	LCD_VCC

**Table 4-14: LCD LVDS Connector Pinouts**

### 4.2.13 LCD TTL Connector

**CN Label:** CN11

**CN Type:** 40-pin crimp connector

**CN Location:** See **Figure 3-13**

**CN Pinouts:** See **Table 3-15**

The LCD TTL connector is connected to a LCD TTL display device.

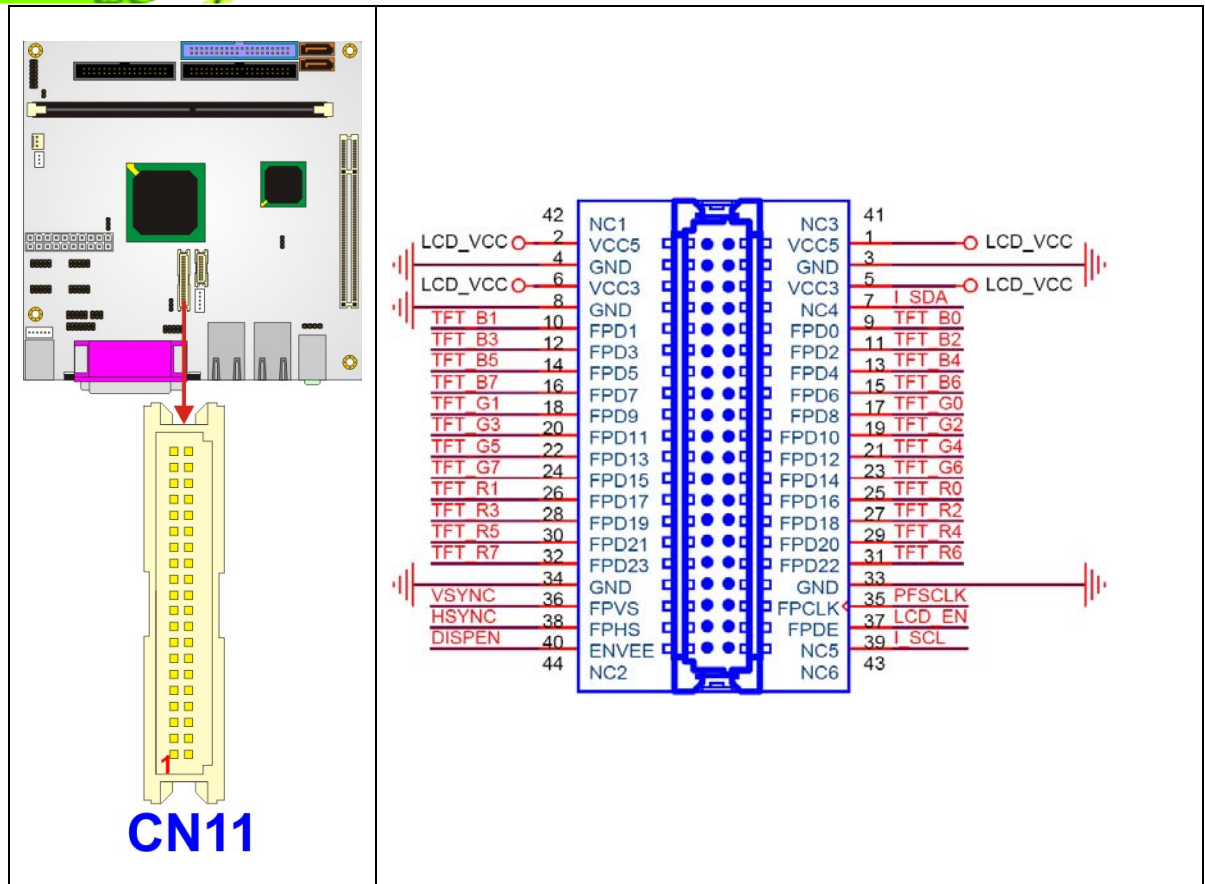


Figure 4-14: LCD TTL Connector Locations

PIN	DESCRIPTION	PIN	DESCRIPTION
2	LCD_VCC	1	LCD_VCC
4	GND	3	GND
6	LCD_VCC	5	LCD_VCC
8	GND	7	SDA
10	B1	9	B0
12	B3	11	B2
14	B5	13	B4
16	B7	15	B6
18	G1	17	G0
20	G3	19	G2
22	G5	21	G4
24	G7	23	G6
26	R1	25	R0

## KINO-LX Mini-ITX SBC

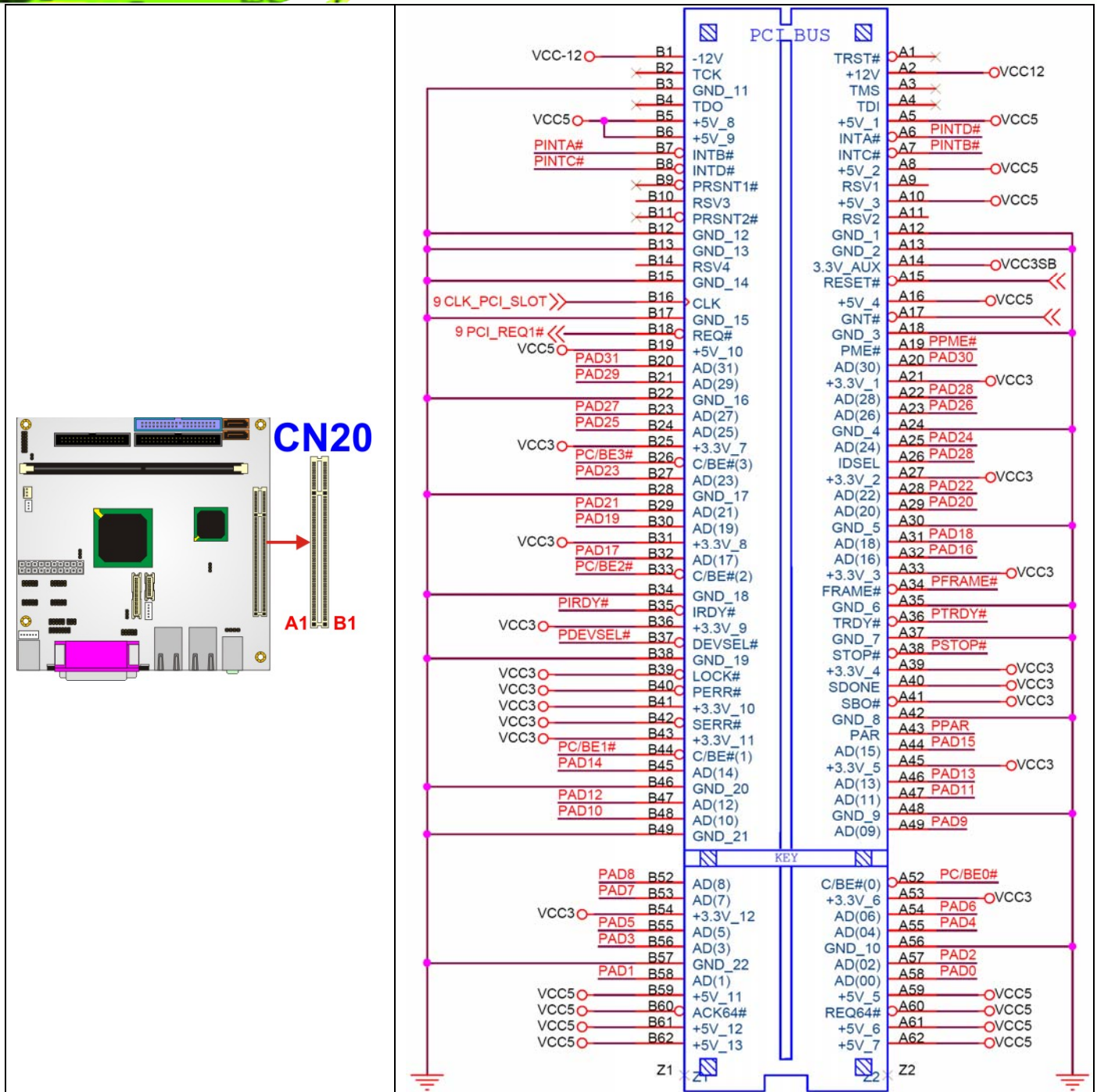
28	R3	27	R2
30	R5	29	R4
32	R7	31	R6
34	GND	33	GND
36	VSYNC	35	CLK
38	HSYNC	37	LCD_EN
40	DISP_EN	39	SCL

**Table 4-15: LCD TTL Connector Pinouts**

### 4.2.14 PCI Slot

- CN Label:** CN20
- CN Type:** PCI slot
- CN Location:** See **Figure 4-15**
- CN Pinouts:** See **Table 4-16**

The PCI slot enables a PCI expansion module to be connected to the board.



**Figure 4-15: PCI Slot Location**

PIN	DESCRIPTION	PIN	DESCRIPTION
A1	TRST	B1	-12V
A2	+12V	B2	TCK



## KINO-LX Mini-ITX SBC

PIN	DESCRIPTION	PIN	DESCRIPTION
A3	TMS	B3	GND
A4	TDI	B4	TDO
A5	+5V	B5	+5V
A6	INTA	B6	+5V
A7	INTC	B7	INTB
A8	+5V	B8	INTD
A9	RESERVED3	B9	PRSNT1
A10	+5V	B10	RESERVED1
A11	RESERVED4	B11	PRSNT2
A12	GND	B12	GND
A13	GND	B13	GND
A14	3.3V_AUX	B14	RESERVED2
A15	RST	B15	GND
A16	+5V	B16	CLK
A17	GNT	B17	GND
A18	GND	B18	REQ
A19	PME	B19	+5V
A20	AD30	B20	AD31
A21	+3.3V	B21	AD29
A22	AD28	B22	GND
A23	AD26	B23	AD27
A24	GND	B24	AD25
A25	AD24	B25	+3.3V
A26	IDSEL	B26	C/BE3
A27	+3.3V	B27	AD23
A28	AD22	B28	GND
A29	AD20	B29	AD21
A30	GND	B30	AD19
A31	AD18	B31	+3.3V
A32	AD16	B32	AD17
A33	+3.3V	B33	C/BE2
A34	FRAME	B34	GND



PIN	DESCRIPTION	PIN	DESCRIPTION
A35	GND	B35	IRDY
A36	TRDY	B36	+3.3V
A37	GND	B37	DEVSEL
A38	STOP	B38	GND
A39	+3.3V	B39	LOCK
A40	SDONE	B40	PERR
A41	SBO	B41	+3.3V
A42	GND	B42	SERR
A43	PAR	B43	+3.3V
A44	AD15	B44	C/BE1
A45	+3.3V	B45	AD14
A46	AD13	B46	GND
A47	AD11	B47	AD12
A48	GND	B48	AD10
A49	AD9	B49	GND
A52	C/BE0	B52	AD8
A53	+3.3V	B53	AD7
A54	AD6	B54	+3.3V
A55	AD4	B55	AD5
A56	GND	B56	AD3
A57	AD2	B57	GND
A68	AD0	B68	AD1
A59	+5V	B59	+5V
A60	REQ64	B60	ACK64
A61	+5V	B61	+5V
A62	+5V	B62	+5V

Table 4-16: PCI Slot

## KINO-LX Mini-ITX SBC

### 4.2.15 RS-232/422/485 Serial Port Connector

- CN Label:** CN10
- CN Type:** 2x7 pin header
- CN Location:** See Figure 3-15
- CN Pinouts:** See Table 3-17

The CN10 serial port connector connects to an RS-232 or RS-485 serial port devices.

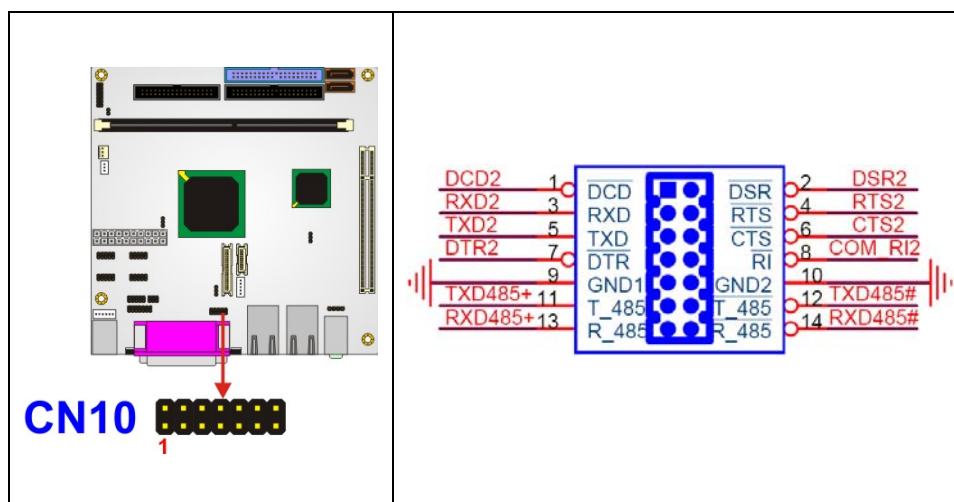


Figure 4-16: RS-232/422/485 Serial Port Connector Pinout Locations

PIN	DESCRIPTION	PIN	DESCRIPTION
1	DCD#	2	DSR#
3	RxD	4	RTS#
5	TxD	6	CTS#
7	DTR#	8	RI # / Vout
9	GND	10	GND
11	TxD485+	12	TxD485-
13	RxD485+	14	RxD485-

Table 4-17: RS-232/422/485 Serial Port Connector Pinouts

#### 4.2.16 RS-232 COM Serial Port Connector

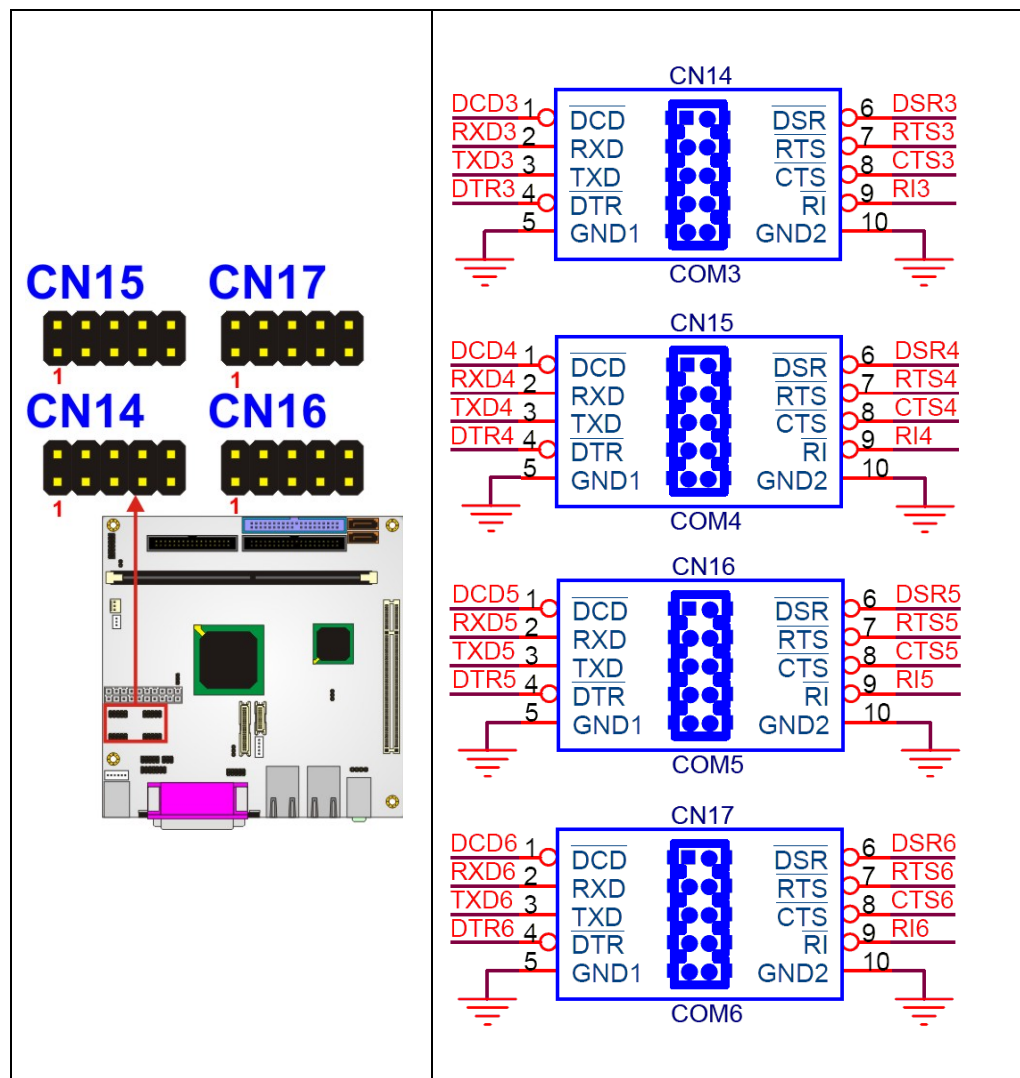
**CN Label:** COM3, COM4, COM5 and COM6

**CN Type:** 10-pin header (2x5)

**CN Location:** See Figure 4-17

**CN Pinouts:** See Table 4-18

The COM3, COM4, COM5 and COM6 serial port connectors connect to RS-232 serial port devices.



**Figure 4-17: RS-232 Serial Port Connector Pinout Locations**

## KINO-LX Mini-ITX SBC

PIN	DESCRIPTION	PIN	DESCRIPTION
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RI
5	GND	10	GND

Table 4-18: RS-232 Serial Port Connector Pinouts

### 4.2.17 SATA Drive Connectors

**CN Label:** CN30 and CN31

**CN Type:** 1x7 pin SATA drive connectors

**CN Location:** See Figure 4-18

**CN Pinouts:** See Table 4-19

The two SATA drive connectors are connected to two first generation SATA drives. First generation SATA drives transfer data at speeds as high as 150Mb/s.

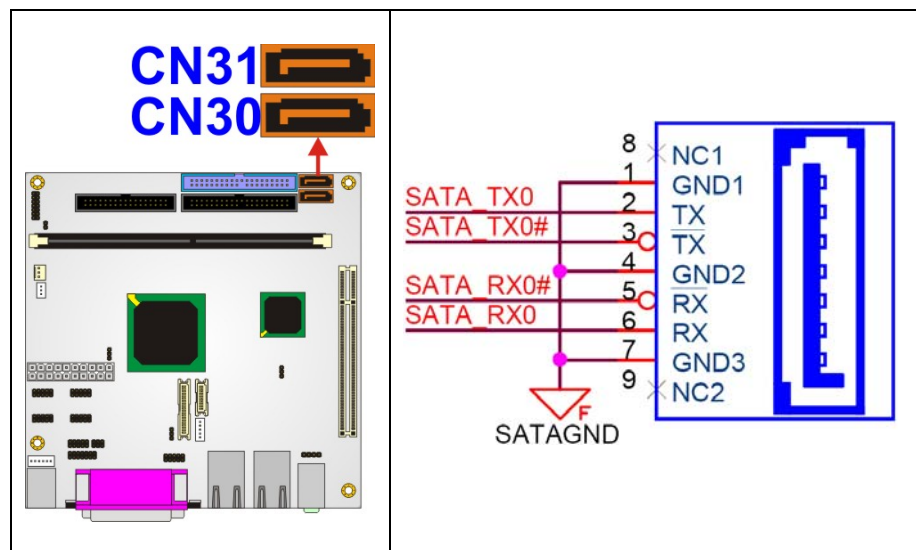


Figure 4-18: SATA Drive Connector Pinout Locations

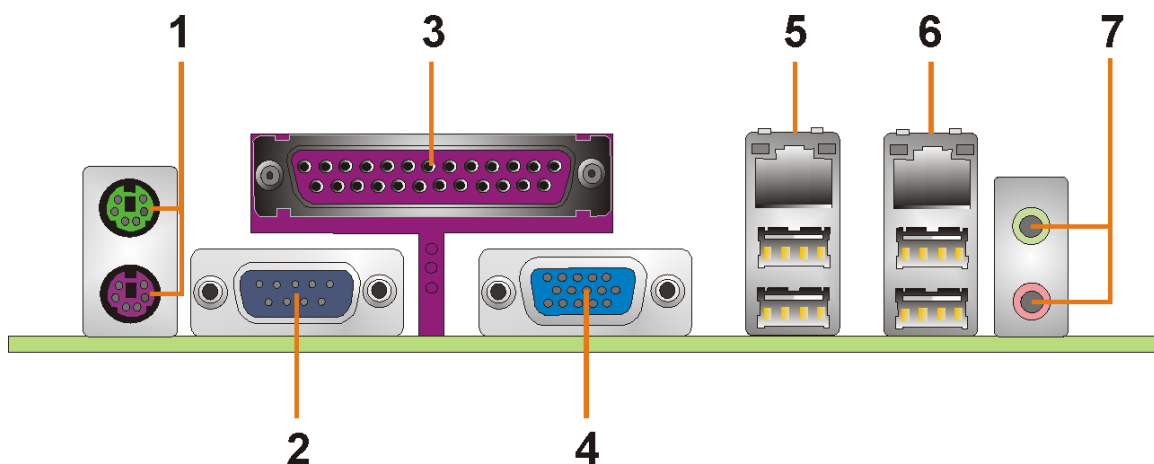
PIN	DESCRIPTION
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

**Table 4-19: SATA Drive Connector Pinouts**

### 4.3 External Peripheral Interface Connector Panel

**Figure 3-18** shows the KINO-LX external peripheral interface connector panel. The peripheral connectors are connected to external devices when the KINO-LX is installed in a chassis. The peripheral connectors on the panel are:

- 1 x PS/2 keyboard and mouse connector
- 1 x Serial port connector
- 1 x Parallel port connector
- 1 x VGA connector
- 2 x RJ-45 GbE connector
- 4 x USB connectors
- 1 x Audio connector (two audio jacks)



**Figure 4-19: KINO-LX External Peripheral Interface Connector Panel**



## KINO-LX Mini-ITX SBC

### 4.3.1 Keyboard/Mouse Connector

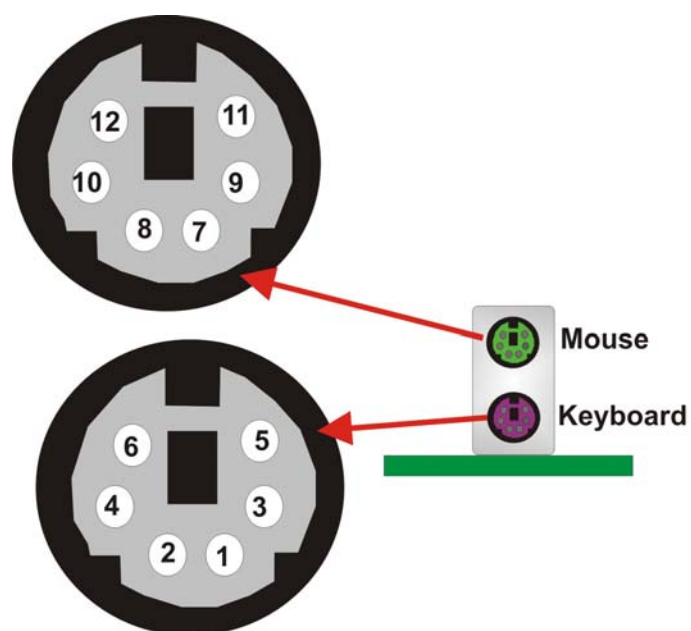
**CN Label:** CN8

**CN Type:** Dual PS/2

**CN Location:** See **Figure 4-19** (labeled number 1)

**CN Pinouts:** See **Figure 4-20** and **Table 3-20**

The KINO-LX keyboard and mouse connectors are standard PS/2 connectors.



**Figure 4-20: Keyboard/Mouse Connector Pinouts**

PIN	DESCRIPTION	PIN	DESCRIPTION
1	L_KDAT	7	L_MDAT
2	NC	8	NC
3	GND	9	GND
4	5V	10	5V
5	L_KCLK	11	L_MCLK
6	NC	12	NC

**Table 4-20: Keyboard/Mouse Connector Pinouts**

### 4.3.2 Serial Port Connector

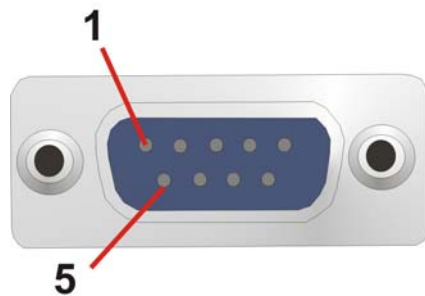
**CN Label:** CN3

**CN Type:** D-sub 9 male connector

**CN Location:** See **Figure 4-19** (labeled number 2)

**CN Pinouts:** See **Figure 4-21** and **Table 4-21**

The KINO-LX has an RS-232 serial port on the external peripheral interface connector panel.



**Figure 4-21: Serial Port Connector**

Serial port connector (COM1) pinouts are shown below.

PIN	Description	PIN	Description
1	DCD1	6	DSR1
2	RXD1	7	RTS1
3	TXD1	8	CTS1
4	DTR1	9	RI 1
5	GROUND		

**Table 4-21: Serial Port Connector Pinouts**

## KINO-LX Mini-ITX SBC

### 4.3.3 Parallel Port Connector

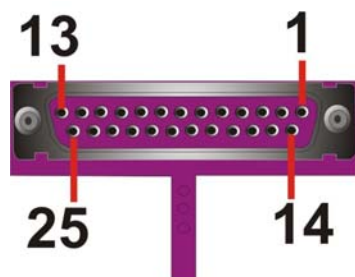
**CN Label:** CN5

**CN Type:** DB-25 female connector

**CN Location:** See **Figure 4-19** (labeled number 3)

**CN Pinouts:** See **Figure 4-22** and **Table 3-22**

The KINO-LX has one parallel port on the external peripheral interface connector panel to connect to a printer or other parallel communication devices.



**Figure 4-22 Parallel Port Connector Pinout Locations**

PIN	DESCRIPTION	PIN	DESCRIPTION
1	STB#	14	AFD#
2	PD0	15	ERR#
3	PD1	16	INIT#
4	PD2	17	SLIN#
5	PD3	18	GND
6	PD4	19	GND
7	PD5	20	GND
8	PD6	21	GND
9	PD7	22	GND
10	ACK#	23	GND
11	BUSY	24	GND
12	PE	25	GND
13	SLCT		

**Table 4-22: Parallel Port Pinouts**

#### 4.3.4 VGA connector

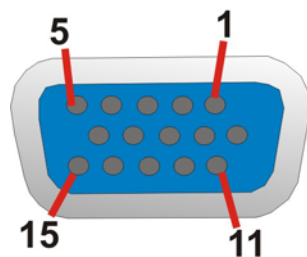
**CN Label:** CN4

**CN Type:** HD-D-sub 15 female connector

**CN Location:** See **Figure 4-19** (labeled number 4)

**CN Pinouts:** See **Figure 4-23** and **Table 4-23**

A 15-pin VGA connector connects to standard displays.



**Figure 4-23: VGA Connector**

PIN	DESCRIPTION	PIN	DESCRIPTION
1	RED	9	NC
2	GREEN	10	GROUND
3	BLUE	11	NC
4	NC	12	DDCDAT
5	GROUND	13	HSYNC
6	GROUND	14	VSYNC
7	GROUND	15	DDCCLK
8	GROUND		

**Table 4-23: VGA Connector Pinouts**

## KINO-LX Mini-ITX SBC

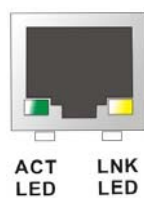
### 4.3.5 LAN Connectors

- CN Label:** CN6 and CN7
- CN Type:** RJ-45
- CN Location:** See **Figure 4-19** (labeled number 5 and 6)
- CN Pinouts:** See **Table 4-24**

The KINO-LX is equipped with two built-in GbE Ethernet controllers. The controllers can connect to the LAN through two RJ-45 LAN connectors. There are two LEDs on the connector indicating the status of LAN. The pin assignments are listed in the following table:

PIN	DESCRIPTION	PIN	DESCRIPTION
1	+2.5VCC	2	TX0+
3	TX0-	4	TX1+
5	TX1-	6	TX2+
7	TX2-	8	TX3+
9	TX3-	10	GND
11	LINK-	12	LINK+
13	ACTIVE-	14	ACTIVE+

**Table 4-24: LAN Pinouts**



**Figure 4-24: RJ-45 Ethernet Connector**

The RJ-45 Ethernet connector has two status LEDs, one green and one yellow (**Figure 3-23**). The green LED indicates activity on the port and the yellow LED indicates the port is linked. See **Table 4-25**.



STATUS	DESCRIPTION	STATUS	DESCRIPTION
GREEN	Activity	YELLOW	Linked

Table 4-25: RJ-45 Ethernet Connector LEDs

#### 4.3.6 USB Connectors

**CN Label:** CN6 and CN7

**CN Type:** USB port

**CN Location:** See **Figure 4-19** (labeled number 5 and 6)

**CN Pinouts:** See **Table 4-26**

The KINO-LX has a four rear panel USB ports. These ports connect to both USB 2.0 and USB 1.1 devices.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	USBV3L 5V	2	GND
3	USBP4N	4	USBP5P
5	USBP4P	6	USBP5N
7	GND	8	USBV3L 5V

Table 4-26: USB Port Pinouts

## KINO-LX Mini-ITX SBC

### 4.3.7 Audio Connector

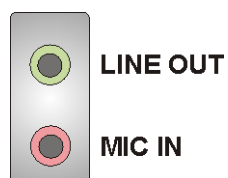
**CN Label:** CN1

**CN Type:** 2 x audio jacks

**CN Location:** See **Figure 3-18** (labeled number 7)

**CN Pinouts:** See **Figure 3-24**

- **Line Out port (Lime):** Connects to a headphone or a speaker. With multi-channel configurations, this port can also connect to front speakers.
- **Microphone (Pink):** Connects a microphone.



**Figure 4-25: Audio Connector**

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Chapter

**5**

# Installation and Configuration

---

## 5.1 Anti-static Precautions



### **WARNING:**

Failure to take ESD precautions during the installation of the KINO-LX may result in permanent damage to the KINO-LX and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the KINO-LX. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the KINO-LX, or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband:*** - Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding:*** - Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad:*** When configuring the KINO-LX, place it on an anti-static pad. This reduces the possibility of ESD damaging the KINO-LX.
- ***Only handle the edges of the PCB:-*** When handling the PCB, hold the PCB by the edges.



## 5.2 Installation Considerations

---



### NOTE:

The following installation notices and installation considerations should be read and understood before the KINO-LX is installed. All installation notices pertaining to the installation of the KINO-LX should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the KINO-LX and injury to the person installing the motherboard.

---

### 5.2.1 Installation Notices

---



### WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the KINO-LX, KINO-LX components and injury to the user.

---

Before and during the installation please **DO** the following:

- **Read the user manual:**
  - The user manual provides a complete description of the KINO-LX installation instructions and configuration options.
- **Wear an electrostatic discharge cuff (ESD):**
  - Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- **Place the KINO-LX on an antistatic pad:**
  - When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- **Turn all power to the KINO-LX off:**

- When working with the KINO-LX, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the KINO-LX **DO NOT:**

- Remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- Use the product before verifying all the cables and power connectors are properly connected.
- Allow screws to come in contact with the PCB circuit, connector pins, or its components.

### 5.2.2 Installation Checklist

The following checklist is provided to ensure the KINO-LX is properly installed.

- All the items in the packing list are present
- The CPU is installed
- The CPU cooling kit is properly installed
- A compatible memory module is properly inserted into the slot
- The jumpers have been properly configured
- The KINO-LX is inserted into a chassis with adequate ventilation
- The correct power supply is being used
- The following devices are properly connected
  - Primary IDE device
  - SATA drives
  - Keyboard and mouse cable
  - Power supply
  - USB cable
  - Serial port cable
  - Parallel port cable
- The following external peripheral devices are properly connected to the chassis:
  - VGA screen
  - Keyboard
  - Mouse
  - RS-232 serial communications device

## KINO-LX Mini-ITX SBC

### 5.3 Unpacking

#### 5.3.1 Unpacking Precautions

When the KINO-LX is unpacked, please do the following:

- Follow the anti-static precautions outlined in **Section 5.1**.
- Make sure the packing box is facing upwards so the KINO-LX does not fall out of the box.
- Make sure all the components in the checklist shown in **Section 5.3.2** are present.

#### 5.3.2 Unpacking Checklist

---



##### NOTE:

If some of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the KINO-LX from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to [sales@iei.com.tw](mailto:sales@iei.com.tw).

---

When the KINO-LX is received, make sure all the components listed below are present.

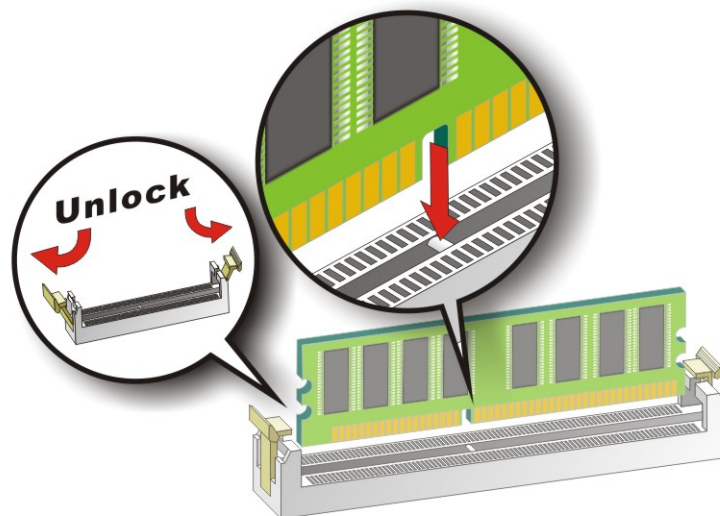
- KINO-LX single board computer
- IDE flat cable
- Dual RS-232 cables
- SATA cables
- SATA power cables
- IO shielding
- Mini jumper Pack
- Quick Installation Guide
- Utility CD

### 5.3.3 DIMM Installation

**WARNING:**

Using incorrectly specified DIMM may cause permanently damage the KINO-LX. Please make sure the purchased DIMM complies with the memory specifications of the KINO-LX. DIMM specifications compliant with the KINO-LX are listed in **Chapter 2**.

To install a DIMM into a DIMM socket, please follow the steps below and refer to **Figure 5-1**.



**Figure 5-1: Installing a DIMM**

- Step 1: Open the DIMM socket handles.** The DIMM socket has two handles that secure the DIMM into the socket. Before the DIMM can be inserted into the socket, the handles must be opened. See **Figure 5-1**.
- Step 2: Align the DIMM with the socket.** The DIMM must be oriented in such a way that the notch in the middle of the DIMM must be aligned with the plastic bridge in the socket. See **Figure 5-1**.
- Step 3: Insert the DIMM.** Once properly aligned, the DIMM can be inserted into the

## KINO-LX Mini-ITX SBC

socket. As the DIMM is inserted, the white handles on the side of the socket will close automatically and secure the DIMM to the socket. See **Figure 5-1**.

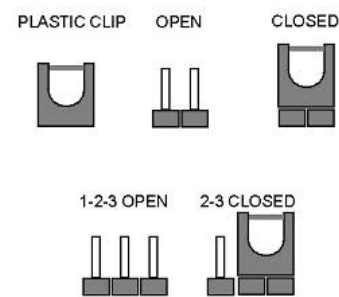
**Step 4: Removing a DIMM.** To remove a DIMM, push both handles outward. The memory module is ejected by a mechanism in the socket.

## 5.4 Jumper Settings



### NOTE:

A jumper is a metal bridge used to close an electrical circuit. It consists of two or three metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To CLOSE/SHORT a jumper means connecting the pins of the jumper with the plastic clip and to OPEN a jumper means removing the plastic clip from a jumper.



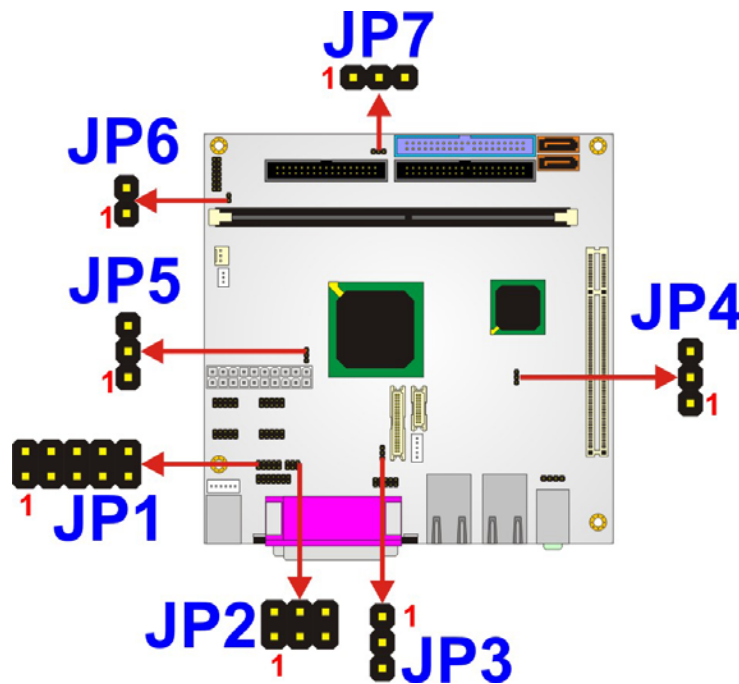
**Figure 5-2: Jumper Locations**

Before the KINO-LX is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the KINO-LX are listed in **Table 5-1**.

Description	Label	Type
Clear CMOS	JP4	3-pin header
CF setup	JP7	3-pin header
LCD voltage select	JP3	3-pin header
COM2 RS-232/422/485 select	JP2	6-pin header
COM1/2 RI and voltage select	JP1	10-pin header
LCD clock setup	JP5	3-pin header
AT/ATX power mode select	JP6	2-pin header

**Table 5-1: Jumpers**





**Figure 5-3: Jumper Locations**

#### 5.4.1 Clear CMOS Jumper

<b>Jumper Label:</b>	<b>JP4</b>
<b>Jumper Type:</b>	3-pin header
<b>Jumper Settings:</b>	See <b>Table 5-2</b>
<b>Jumper Location:</b>	See <b>Figure 5-3</b>

If the KINO-LX fails to boot due to improper BIOS settings, use this connector to clear the CMOS data and reset the system BIOS information. To do this, use the jumper cap to close pins 2 and 3 for a few seconds then reinstall the jumper clip back to pins 1 and 2.

If the “CMOS Settings Wrong” message is displayed during the boot up process, the fault may be corrected by pressing the F1 to enter the CMOS Setup menu. Do one of the following:

- Enter the correct CMOS setting
- Load Optimal Defaults

## KINO-LX Mini-ITX SBC

- Load Failsafe Defaults.

After having done one of the above, save the changes and exit the CMOS Setup menu.

Clear CMOS	DESCRIPTION
Short 1 - 2 (Default)	Keep CMOS Setup
Short 2 - 3	Clear CMOS Setup

**Table 5-2: Clear CMOS Jumper Settings**

### 5.4.2 CF Card Setup

- Jumper Label:** JP7
- Jumper Type:** 3-pin header
- Jumper Settings:** See **Table 5-3**
- Jumper Location:** See **Figure 5-3**

The CF Card Setup jumper sets the CF Type I card or CF Type II cards as either the slave device or the master device. CF Card Setup jumper settings are shown in **Table 5-3**.

CF Card Setup	Description	
Short 1-2	Master	Default
Short 2-3	Slave	

**Table 5-3: CF Card Setup Jumper Settings**

### 5.4.3 LCD Voltage Select Jumper



#### **WARNING:**

Making the wrong setting on this jumper may cause irreparable damage to both the motherboard and the LCD screen connected to the on-board connector.

<b>Jumper Label:</b>	<b>JP3</b>
<b>Jumper Type:</b>	3-pin header
<b>Jumper Settings:</b>	See <b>Table 5-4</b>
<b>Jumper Location:</b>	See <b>Figure 5-3</b>

This jumper allows the user to set the voltage for the LCD panel. Before setting this jumper please refer to the LCD panel user guide to determine the required voltage. After the required voltage is known, make the necessary jumper setting in accordance with the settings shown in **Table 5-4**.

JP3	DESCRIPTION
Short 1-2 (Default)	Panel Voltage select 3V
Short 2-3	Panel Voltage select 5V

**Table 5-4: LCD Voltage Setup Jumper Settings**

#### 5.4.4 COM2 RS-232/422/485 Select

<b>Jumper Label:</b>	<b>JP2</b>
<b>Jumper Type:</b>	6-pin header
<b>Jumper Settings:</b>	See <b>Table 5-5</b>
<b>Jumper Location:</b>	See <b>Figure 5-3</b>

The RS-232/422/485 select jumper sets the communication protocol used by the second serial communications port (COM2) as RS-232, RS-422 or RS-485.

JP2	DESCRIPTION
Short 1-2	RS-232
Short 3-4	RS-422
Short 5-6	RS-485

**Table 5-5: COM2 RS-232/422/485 Select Settings**

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### 5.4.5 COM1/2 RI and Voltage Select Jumper

<b>Jumper Label:</b>	<b>JP1</b>
<b>Jumper Type:</b>	10-pin header
<b>Jumper Settings:</b>	See <b>Table 5-6</b>
<b>Jumper Location:</b>	See <b>Figure 5-3</b>

This jumper allows the user to set the voltage for pin 9 on COM1 or COM2. Pin 9 is traditionally a ring line but this jumper can set pin 9 to supply 5V or 12V power to a serial device connected to COM1 or COM2. Make the necessary jumper setting in accordance with the settings shown in **Table 5-6**.

JP1	DESCRIPTION
1-3	COM1 RI Pin Use +12V
3-5	COM1 RI Pin Use +5V
7-9	COM1 RI Pin Use RI
2-4	COM2 RI Pin Use +12V
4-6	COM2 RI Pin Use +5V
8-10	COM2 RI Pin Use RI

**Table 5-6: COM2 Voltage Setup Jumper Settings**

### 5.4.6 LCD Clock Jumper

<b>Jumper Label:</b>	<b>JP5</b>
<b>Jumper Type:</b>	3-pin header
<b>Jumper Settings:</b>	See <b>Table 5-7</b>
<b>Jumper Location:</b>	See <b>Figure 5-3</b>

The LCD clock jumper sets the LCD panel shift clock.

JP5	Description
1-2	Inverted Output (Default)
2-3	Normal Output

**Table 5-7: LCD Clock Jumper Settings**

### 5.4.7 AT/ATX Power Mode Select Jumper

<b>Jumper Label:</b>	<b>JP6</b>
<b>Jumper Type:</b>	2-pin header
<b>Jumper Settings:</b>	See <b>Table 5-8</b>
<b>Jumper Location:</b>	See <b>Figure 5-3</b>

The AT/ATX power mode select jumper block controls the connection to a power supply.

The AT/ATX power connector is used to connect a chassis power On/Off button using an adapter cable and is configured through the JP6 jumper. The AT/ATX power connector has two operational modes:

1. Using **ATX** power: AT/ATX power connects to an externally implemented power switch, and the JP6 jumper should be left open.
2. Using **AT** power: The pins on JP6 are shorted by a jumper cap. JP6 should be shorted by default as the AMD Southbridge is designed without the consideration for a power button signal. The shorted JP6 provides a hardware feedback to initiate the system. The power on/off function is then managed by the AT power switch button.

JP6	Description
Short	AT Mode (Default)
Open	ATX Mode

**Table 5-8: AT/ATX Power Mode Select Jumper Settings**



## KINO-LX Mini-ITX SBC

### 5.5 Chassis Installation

#### 5.5.1 Airflow



#### **WARNING:**

Airflow is critical to the cooling of the CPU and other onboard components. The chassis in which the KINO-LX must have air vents to allow cool air to move into the system and hot air to move out.

The KINO-LX must be installed in a chassis with ventilation holes on the sides allowing airflow to travel through the heat sink surface. In a system with an individual power supply unit, the cooling fan of a power supply can also help generate airflow through the board surface.

#### 5.5.2 Motherboard Installation

To install the KINO-LX motherboard into the chassis please refer to the reference material that came with the chassis.

### 5.6 Internal Peripheral Device Connections

#### 5.6.1 Peripheral Device Cables

The cables listed in **Table 5-9** are shipped with the KINO-LX.

Quantity	Type
1	ATA 66/100 flat cable
2	Dual RS-232 cable
2	SATA drive cable
1	SATA drive power cable

**Table 5-9: IEI Provided Cables**

### 5.6.2 ATA Flat Cable Connection

The ATA 66/100 flat cable connects to the KINO-LX to one or two IDE devices. To connect an IDE HDD to the KINO-LX please follow the instructions below.

**Step 1: Locate the IDE connector.** The location/s of the IDE device connector/s is/are shown in **Chapter 3**.

**Step 2: Insert the connector.** Connect the IDE cable connector to the onboard connector. See Figure 5-4. A key on the front of the cable connector ensures it can only be inserted in one direction.

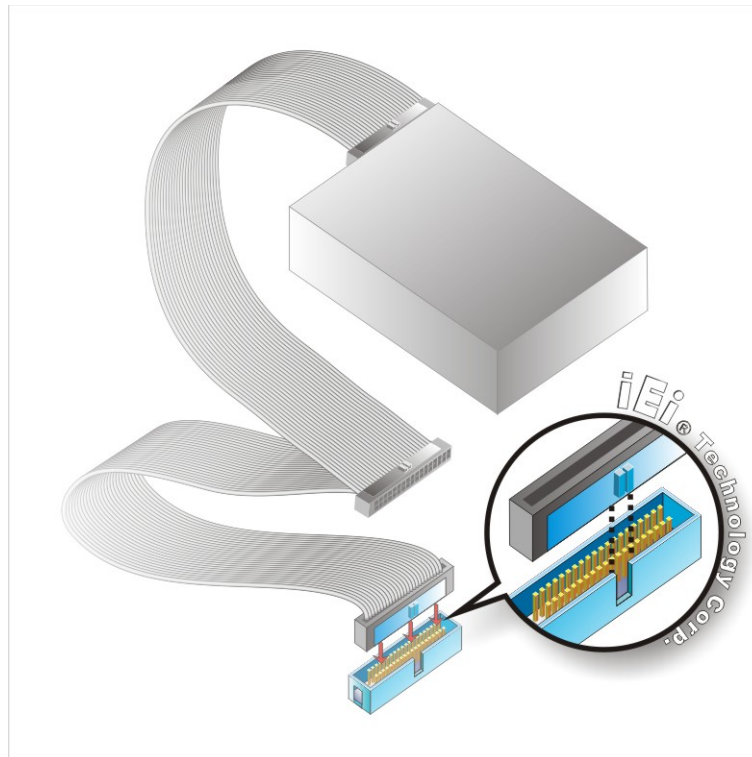


Figure 5-4: IDE Cable Connection

**Step 3: Connect the cable to an IDE device.** Connect the two connectors on the other side of the cable to one or two IDE devices. Make sure that pin 1 on the cable corresponds to pin 1 on the connector.

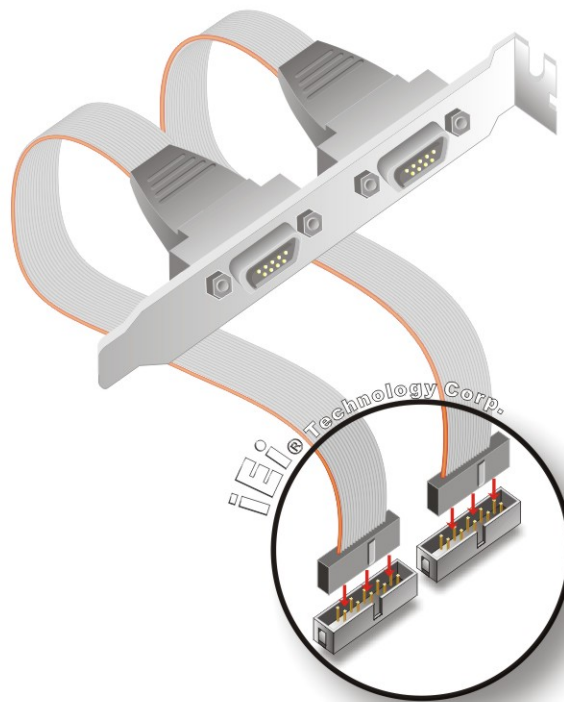
## KINO-LX Mini-ITX SBC

### 5.6.3 Dual RS-232 Cable with Slot Bracket

The dual RS-232 cable slot connector consists of two connectors attached to two independent cables. Each cable is then attached to a D-sub 9 male connector that is mounted onto a slot. To install the dual RS-232 cable, please follow the steps below.

**Step 1: Locate the connectors.** The locations of the RS-232 connectors are shown in Chapter 3.

**Step 2: Insert the cable connectors.** Insert one connector into each serial port box headers. See **Figure 5-5**. A key on the front of the cable connectors ensures the connector can only be installed in one direction.



**Figure 5-5: Dual RS-232 Cable Installation**

**Step 3: Secure the bracket.** The dual RS-232 connector has two D-sub 9 male connectors secured on a bracket. To secure the bracket to the chassis please refer to the reference material that came with the chassis

### 5.6.4 SATA Drive Connection

The KINO-LX is shipped with two SATA drive cables and one SATA drive power cable. To connect the SATA drives to the connectors, please follow the steps below.

**Step 1:** **Locate the connectors.** The locations of the SATA drive connectors are shown in **Chapter 3**.

**Step 2:** **Insert the cable connector.** Press the clip on the connector at the end of the SATA cable and insert the cable connector into the onboard SATA drive connector. See **Figure 5-6**.

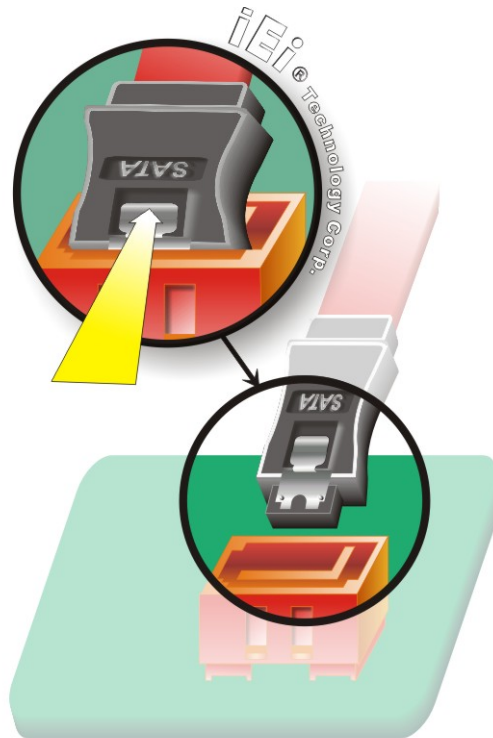


Figure 5-6: SATA Drive Cable Connection

**Step 3:** **Connect the cable to the SATA disk.** Connect the connector on the other end of the cable to the connector at the back of the SATA drive. See **Figure 5-7**.

**Step 4:** **Connect the SATA power cable.** Connect the SATA power connector to the back of the SATA drive. See **Figure 5-7**.





**Figure 5-7: SATA Power Drive Connection**

## 5.7 External Peripheral Interface Connection

The following external peripheral devices can be connected to the external peripheral interface connectors.

- Audio devices
- Parallel port devices
- PS/2 devices
- RJ-45 Ethernet cable connectors
- Serial port devices
- USB devices
- VGA monitors

To install these devices, connect the corresponding cable connector from the actual device to the corresponding KINO-LX external peripheral interface connector making sure the pins are properly aligned.



### 5.7.1 Audio Connection

Audio signals are interfaced through three phone jack connections. The red phone jack is for Mic In and green is for Speaker Out. Follow the steps below to connect audio devices to the KINO-LX.

**Step 5: Locate the audio phone jacks.** The location of the audio phone jacks are shown in **Chapter 3**.

**Step 6: Insert audio phone jack plugs.** Insert audio phone jack plugs into the audio phone jacks on the external peripheral interface. See **Figure 5-8**.

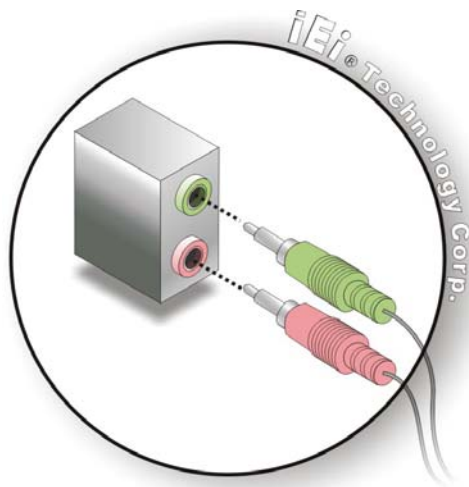


Figure 5-8: Audio Connectors

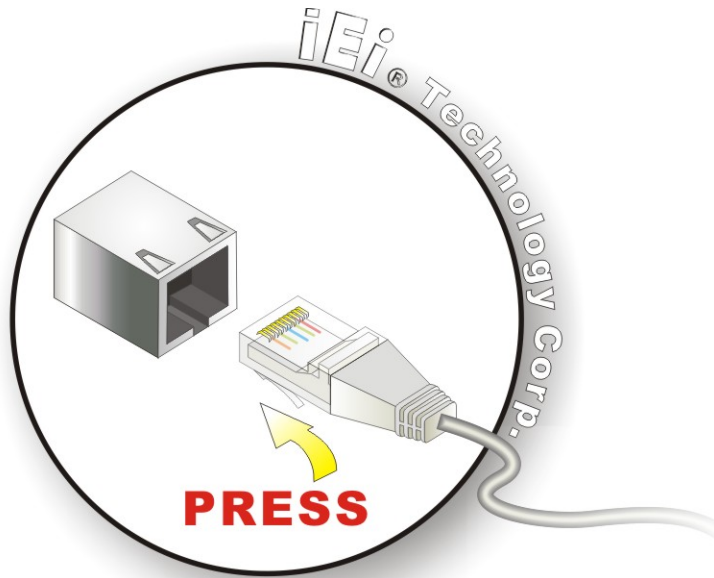
### 5.7.2 LAN Connection (Single Connector)

There are two external RJ-45 LAN connectors. The RJ-45 connectors enable connection to an external network. To connect a LAN cable with an RJ-45 connector, please follow the instructions below.

**Step 7: Locate the RJ-45 connectors.** The locations of the USB connectors are shown in **Chapter 4**.

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**Step 8: Align the connectors.** Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the KINO-LX. See **Figure 5-9**.



**Figure 5-9: LAN Connection**

**Step 9: Insert the LAN cable RJ-45 connector.** Once aligned, gently insert the LAN cable RJ-45 connector into the onboard RJ-45 connector.

### 5.7.3 Parallel Device Connection

The KINO-LX has a single female DB-25 connector on the external peripheral interface panel for parallel devices. Follow the steps below to connect a parallel device to the KINO-LX.

**Step 1: Locate the DB-25 connector.** The location of the DB-25 connector is shown in **Chapter 3**.

**Step 2: Insert the DB-25 connector.** Insert the DB-25 connector of a parallel device into the DB-25 connector on the external peripheral interface. See **Figure 5-10**.

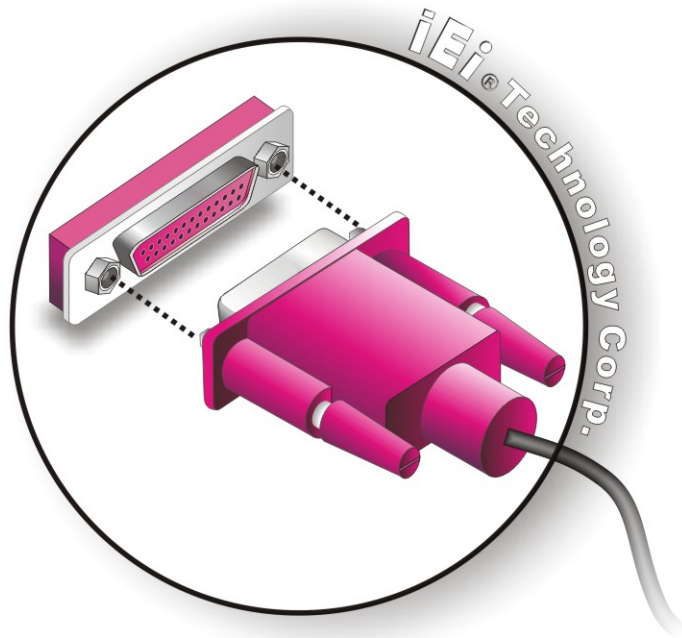


Figure 5-10: Parallel Device Connector

**Step 3: Secure the connector.** Secure the DB-25 connector to the external interface by tightening the two retention screws on either side of the connector.

#### 5.7.4 PS/2 Keyboard and Mouse Connection

The KINO-LX has a dual PS/2 connector on the external peripheral interface panel. The dual PS/2 connector is used to connect to a keyboard and mouse to the system. Follow the steps below to connect a keyboard and mouse to the KINO-LX.

**Step 1: Locate the dual PS/2 connector.** The location of the dual PS/2 connector is shown in **Chapter 3**.

**Step 2: Insert the keyboard/mouse connector.** Insert a PS/2 keyboard or mouse connector into the appropriate PS/2 connector on the external peripheral interface connector. See Figure 5-11.

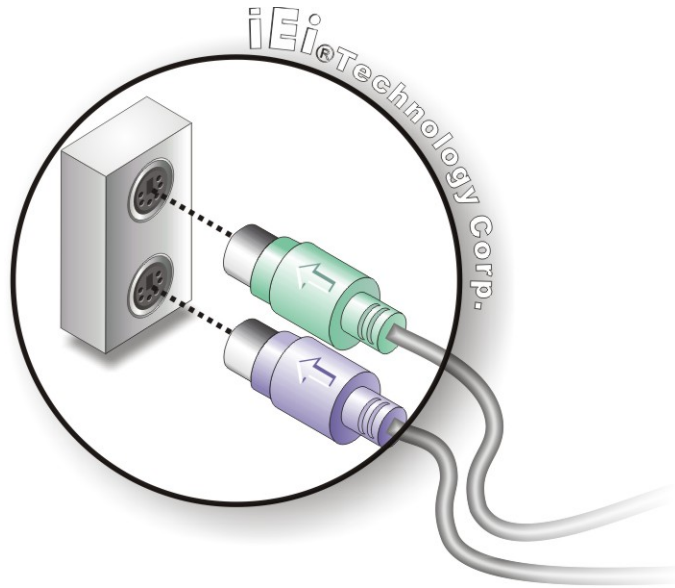


Figure 5-11: PS/2 Keyboard/Mouse Connector

### 5.7.5 Serial Device Connection

The KINO-LX has a single female DB-9 connector on the external peripheral interface panel for a serial device. Follow the steps below to connect a serial device to the KINO-LX.

**Step 3: Locate the DB-9 connector.** The location of the DB-9 connector is shown in Chapter 3.

**Step 4: Insert the serial connector.** Insert the DB-9 connector of a serial device into the DB-9 connector on the external peripheral interface. See Figure 5-12.



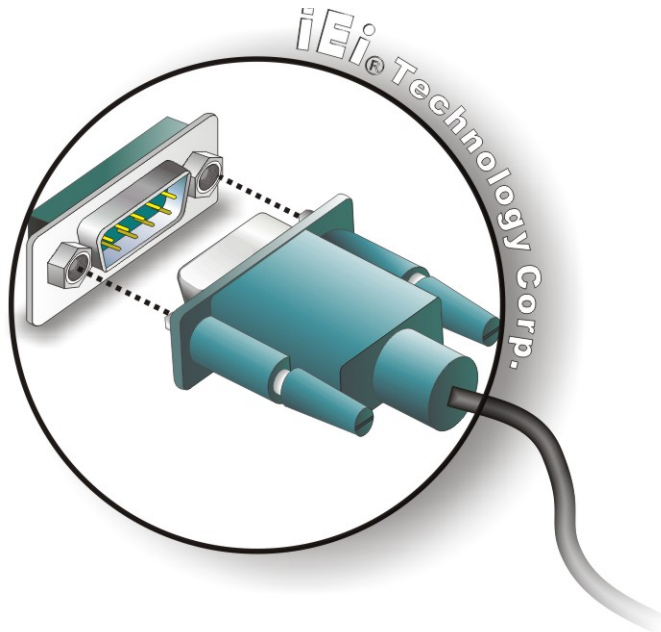


Figure 5-12: Serial Device Connector

**Step 5: Secure the connector.** Secure the serial device connector to the external interface by tightening the two retention screws on either side of the connector.

#### 5.7.6 USB Connection (Dual Connector)

The external USB Series "A" receptacle connectors provide easier and quicker access to external USB devices. Follow the steps below to connect USB devices to the KINO-LX.

**Step 1: Locate the USB Series "A" receptacle connectors.** The location of the USB Series "A" receptacle connectors are shown in **Chapter 3**.

**Step 2: Insert a USB Series "A" plug.** Insert the USB Series "A" plug of a device into the USB Series "A" receptacle on the external peripheral interface. See Figure 5-13.



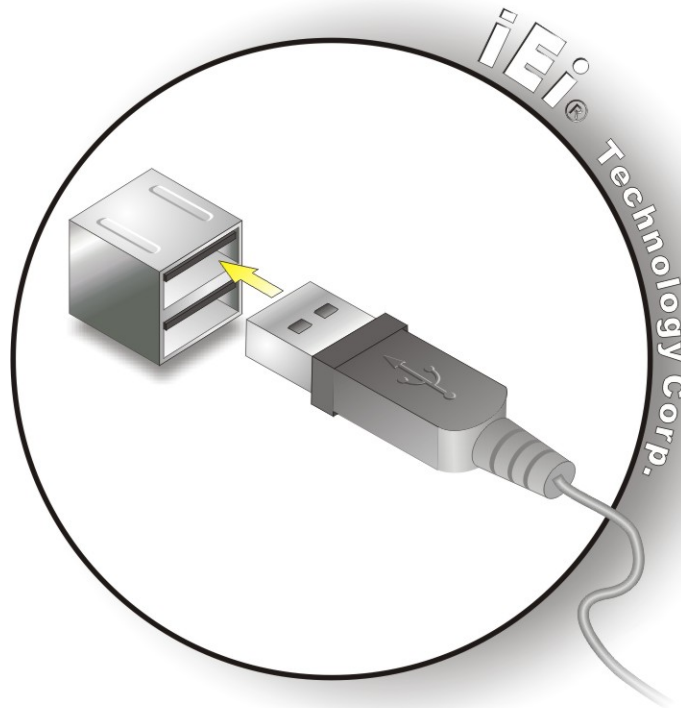


Figure 5-13: USB Connector

### 5.7.7 VGA Monitor Connection

The KINO-LX has a single female DB-15 connector on the external peripheral interface panel. The DB-15 connector is connected to a CRT or VGA monitor. To connect a monitor to the KINO-LX, please follow the instructions below.

- Step 3: Locate the female DB-15 connector.** The location of the female DB-15 connector is shown in **Chapter 3**.
- Step 4: Align the VGA connector.** Align the male DB-15 connector on the VGA screen cable with the female DB-15 connector on the external peripheral interface.
- Step 5: Insert the VGA connector** Once the connectors are properly aligned with the insert the male connector from the VGA screen into the female connector on the KINO-LX. See **Figure 5-14**.

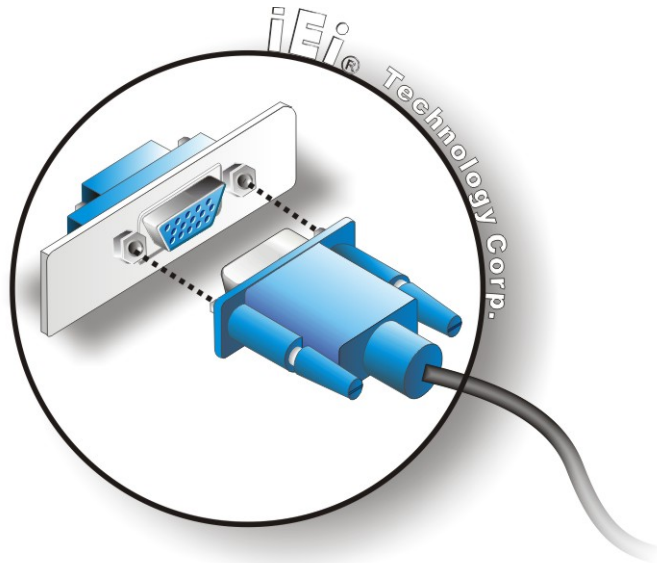


Figure 5-14: VGA Connector

**Step 6: Secure the connector.** Secure the DB-15 VGA connector from the VGA monitor to the external interface by tightening the two retention screws on either side of the connector.

Chapter

6

# Award BIOS Setup

---

## 6.1 Introduction

A licensed copy of Phoenix Award BIOS is preprogrammed into the ROM BIOS. The BIOS setup program allows users to modify the basic system configuration. This chapter describes how to access the BIOS setup program and the configuration options that may be changed.

### 6.1.1 Starting Setup

The Phoenix Award BIOS is activated when the computer is turned on. The setup program can be activated in one of two ways.

1. Press the **DELETE** key as soon as the system is turned on or
2. Press the **DELETE** key when the “**Press Del to enter SETUP**” message appears on the screen.

If the message disappears, restart the computer and try again.

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## 6.1.2 Using Setup

Use the arrow keys to highlight items, press **ENTER** to select, use the **PAGEUP** and **PAGEDOWN** keys to change entries, press **F1** for help and press **ESC** to quit. Navigation keys are shown below.

Key	Function
Up arrow	Move to the item above
Down arrow	Move to the item below
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
+ / Page up	Increase the numeric value or make changes
- / Page down	Decrease the numeric value or make changes
Esc	Main Menu – Quit and do not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
F1	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2	Item help
F5	Previous values for the page menu items
F6	Fail-safe defaults for the current page menu items
F7	Optimized defaults for the current page menu items
F9	Menu in BIOS
F10	Save changes and Exit BIOS

Table 6-1: BIOS Navigation Keys

## 6.1.3 Getting Help

When **F1** is pressed a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press **ESC** or the **F1** key again.

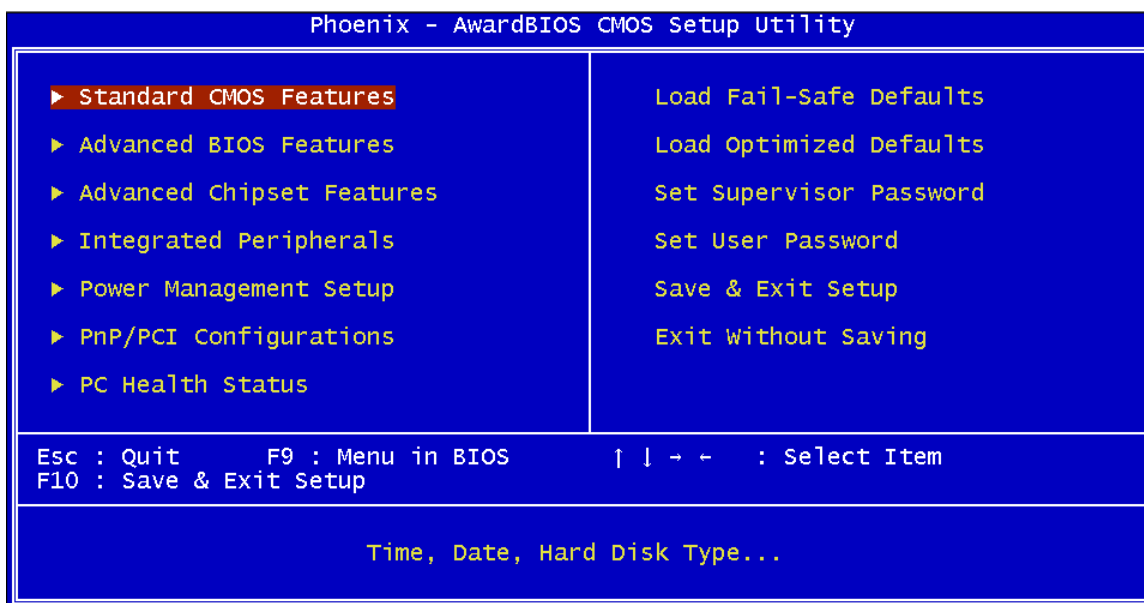


### 6.1.4 Unable to Reboot After Configuration Changes

If the system cannot be booted after changes are made, restore the CMOS defaults. The CPU card should come with a restore CMOS settings jumper. Refer to **Section 4.5.1** for more information.

### 6.1.5 Main BIOS Menu

Once the BIOS opens, the main menu (BIOS Menu 1) appears.



**BIOS Menu 1: AwardBIOS CMOS Setup Utility**



#### **NOTE:**

The following sections will completely describe the menus listed below and the configuration options available to users.

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The following menu options are seen in BIOS Menu 1.

- **Standard CMOS Features:** Changes the basic system configuration.
- **Advanced BIOS Features:** Changes the advanced system settings.
- **Advanced Chipset Features:** Changes the chipset configuration features.
- **Integrated Peripherals:** Changes the settings for integrated peripherals.
- **Power Management Setup:** Configures power saving options.
- **PnP/PCI Configurations:** Changes the advanced PCI/PnP settings.
- **PC Health Status:** Monitors essential system parameters.

The following user configurable options are also available in **BIOS Menu 1**:

### → **Load Fail-Safe Defaults**

Select this option to load failsafe default values for each BIOS parameter in the setup menus. Press **F6** for this operation on any page.

### → **Load Optimized Defaults**

Select this option to load optimal default values for each BIOS parameter in the setup menus. Press **F7** for this operation on any page.

### → **Set Supervisor Password**

By default, no supervisor password is set. To install a supervisor password, select this field and enter the password. After this option is selected, a red dialogue box appears with “**Enter Password:** ”. Type the password and press **ENTER**. Retype the original password into the “**Confirm Password:** ” dialogue box and press **ENTER**. To disable the password, simply press **ENTER** in the “**Enter Password:** ” dialogue box, then press any key in the “**Password Disabled !!!**” dialogue box.

### → **Set User Password**

By default no user password is set. To install a user password, select this field and enter the password. After this option is selected, a red dialogue box appears with “**Enter Password:** ”. Type the password and press **ENTER**. Retype the original password into the “**Confirm Password:** ” dialogue box and press **ENTER**. To disable the password, simply

press **ENTER** in the “**Enter Password:**” dialogue box, then press any key in the “**Password Disabled !!!**” dialogue box.

➔ **Save & Exit Setup**

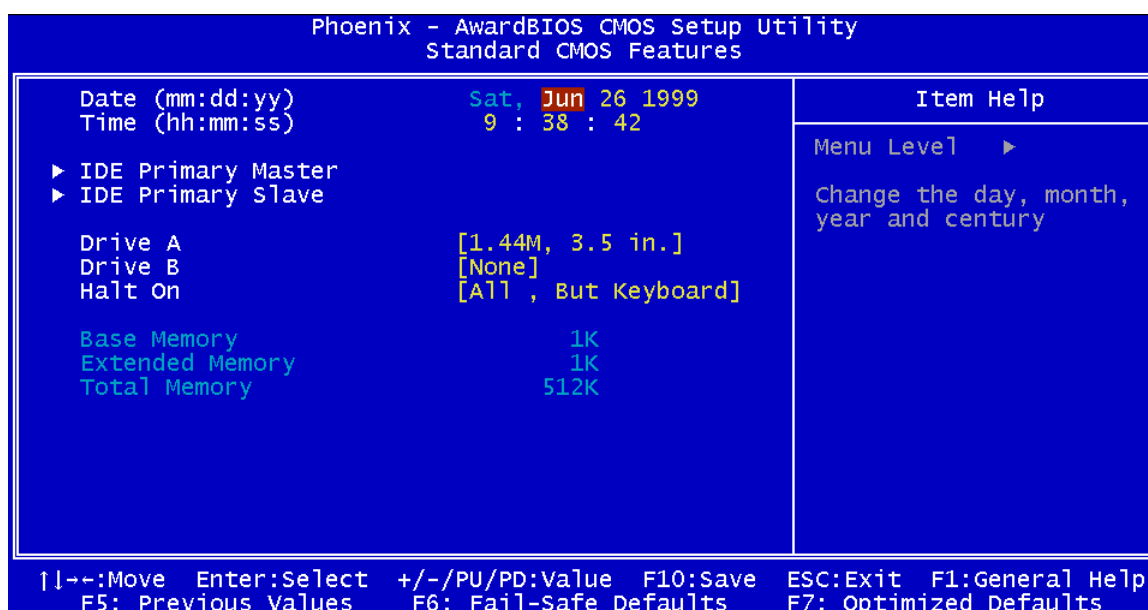
Select this option to save any configuration changes made and exit the BIOS menus.

➔ **Exit Without Saving**

Select this option exit the BIOS menus without saving any configuration changes.

## 6.2 Standard CMOS Features

Use the Standard CMOS Features BIOS menu (**BIOS Menu 2**) to set basic BIOS configuration options.



### BIOS Menu 2: Standard CMOS Features

➔ **Date [Day mm:dd:yyyy]**

The **Date** option sets the system date.

➔ **Time [hh/mm/ss]**

The **Time** option sets the system time.

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### → IDE Master and IDE Slave

When entering setup, BIOS auto detects the presence of IDE devices. The **Standard CMOS Features** menu shows the status of the auto detected IDE devices. The following IDE devices are detected and shown in the **Standard CMOS Features** menu:

- IDE Primary Master
- IDE Primary Slave

IDE device configurations are changed or set in the IDE Configuration menu (**BIOS Menu 3**). If an IDE device is detected, and one of the above listed two BIOS configuration options is selected, the IDE configuration options shown in **Section 6.2.1** appear.

### → Drive A [1.44M, 3.5in]

Use the Drive A configuration to specify the floppy drive type installed in the system. The floppy drive configuration options are:

- None
- 360K, 5.25 in.
- 1.2M, 5.25 in.
- 720K, 3.5 in.
- 1.44M, 3.5in (Default)
- 2.88M, 3.5 in.

### → Drive B [None]

Use the Drive B configuration to specify the floppy drive type installed in the system. The floppy drive configuration options are:

- None (Default)
- 360K, 5.25 in.
- 1.2M, 5.25 in.
- 720K, 3.5 in.
- 1.44M, 3.5in
- 2.88M, 3.5 in.

→ **Halt On [All, But Keyboard]**

Use the Halt On option to specify what errors detected during the power up process stop the system.

- |   |                          |           |  |
|---|--------------------------|-----------|--|
| → | <b>All Errors</b>        |           | Whenever BIOS detects a non-fatal error the system is stopped and the user prompted.         |
| → | <b>No Errors</b>         |           | The system boot is not stopped for any errors that may be detected.                          |
| → | <b>All, But Keyboard</b> | (Default) | The system boot does not stop for a keyboard error; it stops for all other errors.           |
| → | <b>All, But Diskette</b> |           | The system boot does not stop for a disk error; it stops for all other errors.               |
| → | <b>All, But Disk/Key</b> |           | The system boot does not stop for a keyboard or a disk error; it stops for all other errors. |

→ **Base Memory:**

The **Base Memory** is NOT user configurable. The POST determines the amount of base (or conventional) memory installed in the system. The value of the base memory is typically 512K for systems with 512K memory installed, or 640K for systems with 640K or more memory installed.

→ **Extended Memory**

The **Extended Memory** is NOT user configurable. The BIOS determines how much extended memory is present during the POST. This is the amount of memory above 1MB located in the memory address map of the CPU.

→ **Total Memory**

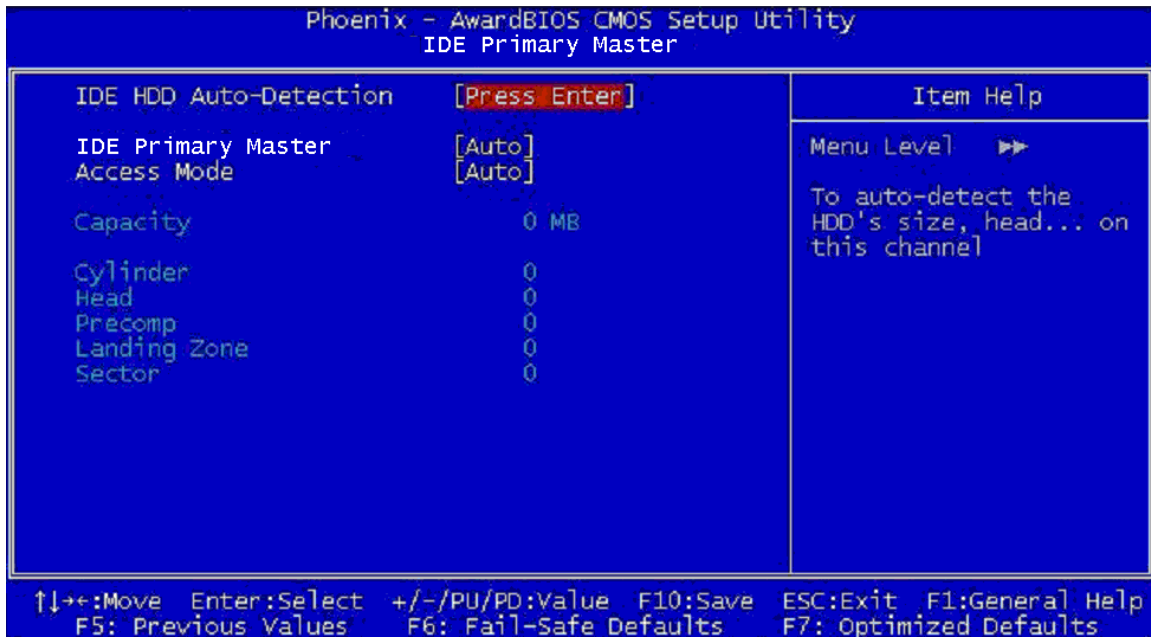
The **Total Memory** is NOT user configurable.



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### 6.2.1 IDE Primary Master/Slave

Use the IDE Primary Master/Slave menu (**BIOS Menu 3**) to set or change the master/slave IDE configurations.



#### BIOS Menu 3: IDE Primary Master

##### → IDE HDD Auto-Detection [Press Enter]

Use the **IDE HDD Auto-Detection** option to enable BIOS to automatically detect the IDE settings. Select **IDE HDD Auto-Detection** and press **ENTER**. BIOS automatically detects the HDD type. Do not set this option manually.

##### → IDE Primary Master [Auto]

Use the **IDE Primary Master** option to activate or deactivate the following drive channels:

- Channel 0 Master
- Channel 0 Slave
- Channel 1 Master
- Channel 0 Slave

- **None**  
If no drives are connected to the IDE channel select this option. Once set, this IDE channel becomes inaccessible and any drives attached to it are undetected.
- **Auto** (Default)  
Setting this option allows the device to be automatically detected by the BIOS.
- **Manual**  
Selecting this option allows manual configuration of the device on the IDE channel in BIOS.

#### → Access Mode [Auto]

The **Access Mode** option can only be configured if the **IDE Primary Master** is set to either **Manual** or **Auto**. Use the **Access Mode** option to determine the hard disk BIOS translation modes. Most systems now use hard drives with large capacities and therefore either the LBA translation mode or auto mode should be selected.

- **CHS**  
Select this mode if the HDD capacity is less than 504MB.
- **LBA**  
Select this mode if the HDD capacity is more than 8.4GB.
- **Large**  
This mode is an extended ECHS mode and while it supports HDDs larger than 504MB, it is not recommended.
- **Auto** (Default)  
If you are unsure of what access mode to set, select this option.

#### → Capacity

The **Capacity** specification indicates the storage capacity of the HDD installed in the system.

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### → Cylinder

The **Cylinder** specification indicates how many cylinders (tracks) are on the HDD installed in the system.

### → Head

The **Head** specification indicates how many logical heads are on the HDD installed in the system.

### → Precomp

The **Precomp** specification indicates on what track the write precompensation begins.

### → Landing Zone

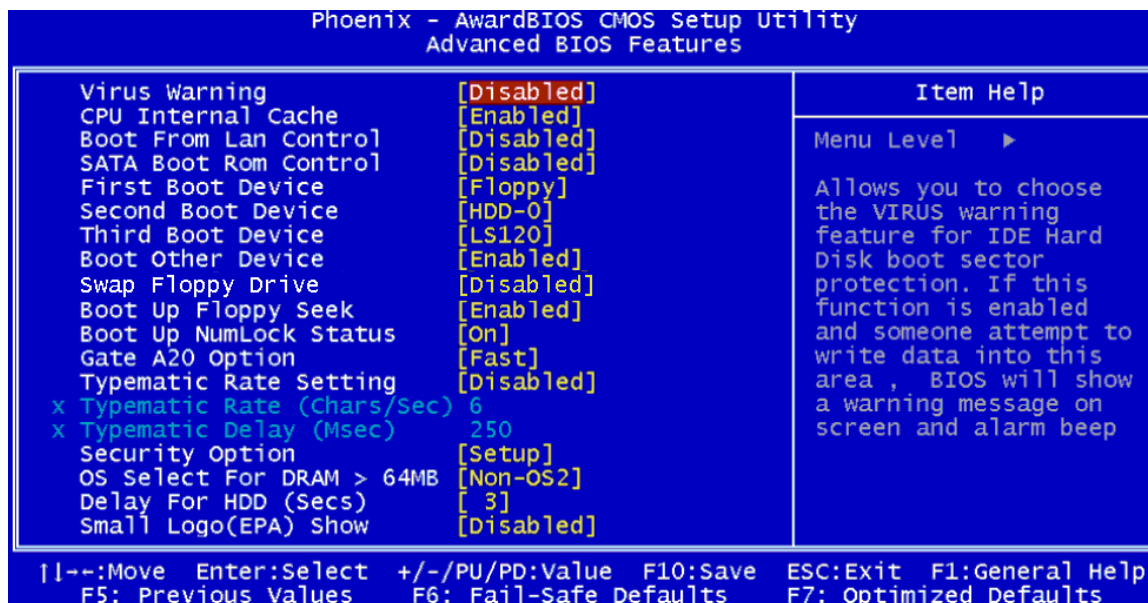
The **Landing Zone** specification indicates where the disk head will park itself after the system powers off.

### → Sector

The **Sector** specification indicates how many logical sectors the HDD has been divided into.

## 6.3 Advanced BIOS Features

CPU and peripheral device configuration options are accessed in the **Advanced BIOS Features** menu (**BIOS Menu 4**).



### BIOS Menu 4: Advanced BIOS Features

#### ➔ Virus Warning [Disabled]



#### NOTE:

Many disk diagnostic programs can cause the above warning message to appear when the program attempts to access the boot sector table. If you are running such a program, it is recommended that the virus protection function be disabled beforehand.

Use the **Virus Warning** option to enable BIOS to monitor the boot sector and partition table of the HDD for any attempted modification. If a modification attempt is made, the BIOS halts the system and an error message appears. If necessary, an anti-virus program can then be run to locate and remove the virus before any damage is done.

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- ➔ **Enabled** Activates automatically when the system boots up causing a warning message to appear when anything attempts to access the boot sector or HDD partition table.
- ➔ **Disabled** (Default) No warning message appears when there is an attempt to access the boot sector or HDD partition table.

### ➔ **CPU Internal Cache [Enabled]**

Use the **CPU Internal Cache** option to enable or disable the internal CPU cache.

- ➔ **Disabled** The internal CPU cache is disabled.
- ➔ **Enabled** (Default) The internal CPU cache is enabled.

### ➔ **Boot From LAN Control [Disabled]**

Use the **BOOT From LAN Control** option to enable the system to be booted from a remote system.

- ➔ **Disabled** (Default) The system cannot be booted from a remote system through the LAN.
- ➔ **Enabled** The system can be booted from a remote system through the LAN.

### ➔ **SATA Boot ROM Control [Disabled]**

Use the **SATA Boot ROM Control** option to configure SATA IDE use in DOS mode.

- ➔ **Disabled** (Default) Disables SATA IDE use in DOS mode.
- ➔ **Enabled** Enables SATA IDE use in DOS mode.

### ➔ **Boot Device**

Use the **Boot Device** options to select the order of the devices the system boots from.

There are three boot device configuration options:



- **First Boot Device** [Default: Floppy]
- **Second Boot Device** [Default: HDD-0]
- **Third Boot Device** [Default: LS120]

Using the default values, the system first looks for a floppy disk to boot from. If it cannot find a floppy disk, it boots from an HDD. If both The floppy and the HDD are unavailable, the system boots from a CDROM drive.

Boot Device configuration options are:

- Floppy
- LS120
- HDD-0
- SCSI
- CDROM
- HDD-1
- ZIP100
- USB-FDD
- USB-ZIP
- USB-CDROM
- USB-HDD
- LAN
- Disabled

#### → **Boot Other Device** [Enabled]

Use the **Boot Other Device** option to determine whether the system uses a second or third boot device if the first boot device is not found.

- **Disabled**                      The system does not look for second and third boot devices if the first one is not found.
- **Enabled**    (Default)      The system looks for second and third boot devices if the first one is not found.

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### → Swap Floppy Drive [Disabled]

The **Swap Floppy Drive** option is effective only in systems with two floppy drives.

Selecting **Enabled** assigns physical drive B to logical drive A, and physical drive A to logical drive B.

→ **Enabled** Assigns physical drive B to logical drive A, and physical drive A to logical drive B.

→ **Disabled** (Default) Default physical/logical drive assignments.

### → Boot Up Floppy Seek [Disabled]

Use the **Boot Up Floppy Seek** option to enable the BIOS to determine if the floppy disk drive installed has 40 or 80 tracks during the POST. 360K FDDs have 40 tracks while 760K, 1.2M and 1.44M FDDs all have 80 tracks.

→ **Disabled** (Default) BIOS does not search for the type of FDD drive by track number. Note that there is no warning message if the drive installed is 360K.

→ **Enabled** BIOS searches for a FDD to determine if it has 40 or 80 tracks. Note that BIOS cannot tell the difference between 720K, 1.2M or 1.44M drives as they all have 80 tracks.

### → Boot Up Numlock Status [On]

Use the **Boot Up Numlock Status** option to specify the default state of the numeric keypad.

→ **Off** The keys on the keypad are not activated.

→ **On** (Default) Activates the keys on the keypad.

→ **Gate A20 Option [Fast]**

Use the **Gate A20 Option** option to set if the keyboard controller or the chipset controls the Gate A20 switching.

- **Normal**                      The keyboard controller does the switching.
- **Fast**                      (Default)      The chipset does the switching.

→ **Typematic Rate Setting [Disabled]**

Use the **Typematic Rate Setting** configuration option to specify if only one character is allowed to appear on the screen if a key is continuously held down. When this option is enabled, the BIOS reports as before, but it then waits a moment, and, if the key is still held down, it begins to report that the key has been pressed repeatedly. This feature accelerates cursor movement with the arrow keys.

- **Disabled**                      (Default)      Disables the typematic rate.
- **Enabled**                      Enables the typematic rate.

→ **Typematic Rate (Chars/sec) [6]**

The **Typematic Rate** option can only be configured if the **Typematic Rate Setting** is enabled. Use the **Typematic Rate** option to specify the rate keys are accelerated.

- **6**                      (Default)      6 characters per second
- **8**                      8 characters per second
- **10**                      10 characters per second
- **12**                      12 characters per second
- **15**                      15 characters per second
- **20**                      20 characters per second
- **24**                      24 characters per second

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→ **30** 30 characters per second

→ **Typematic Delay (Msec) [250]**

The **Typematic Rate** option can only be configured if the **Typematic Rate Setting** is enabled. Use the **Typematic Delay** option to specify the delay time between when a key is first pressed and when the acceleration begins.

- **250** (Default) 250 milliseconds
- **500** 500 milliseconds
- **750** 750 milliseconds
- **1000** 1000 milliseconds

→ **Security Option [Setup]**

Use the **Security Option** to limit access to both the system and Setup, or just Setup.

- **Setup** (Default) The system does not boot and access to Setup is denied if the correct password is not entered at the prompt.
- **System** The system boots, but access to Setup is denied if the correct password is not entered at the prompt.

**NOTE:**

To disable security, select the password setting in the Main Menu. When asked to enter a password, don't type anything, press **ENTER** and the security is disabled. Once the security is disabled, the system boots and **Setup** can be accessed.

---

→ **OS Select For DRAM > 64MB [Non-OS2]**

Use the **OS Select For DRAM > 64MB** option to specify the operating system.

- **Enabled** Specifies the operating system used as OS/2.
- **Disabled** (Default) Select this option when not using the OS/2 operating system.

→ **Delay for HDD (Secs) [3]**

Use the **Delay for HDD** option to specify the period of time the system should wait before the HDD is identified. If selected, the user is asked to enter a number between 0 and 15.

The number specified is the number of seconds the system waits before the HDD is identified.

→ **Small Logo (EPA) Show [Disabled]**

Use the **Small Logo (EPA) Show** option to specify if the Environmental Protection Agency (EPA) logo appears during the system boot-up process. If enabled, the boot up process may be delayed.

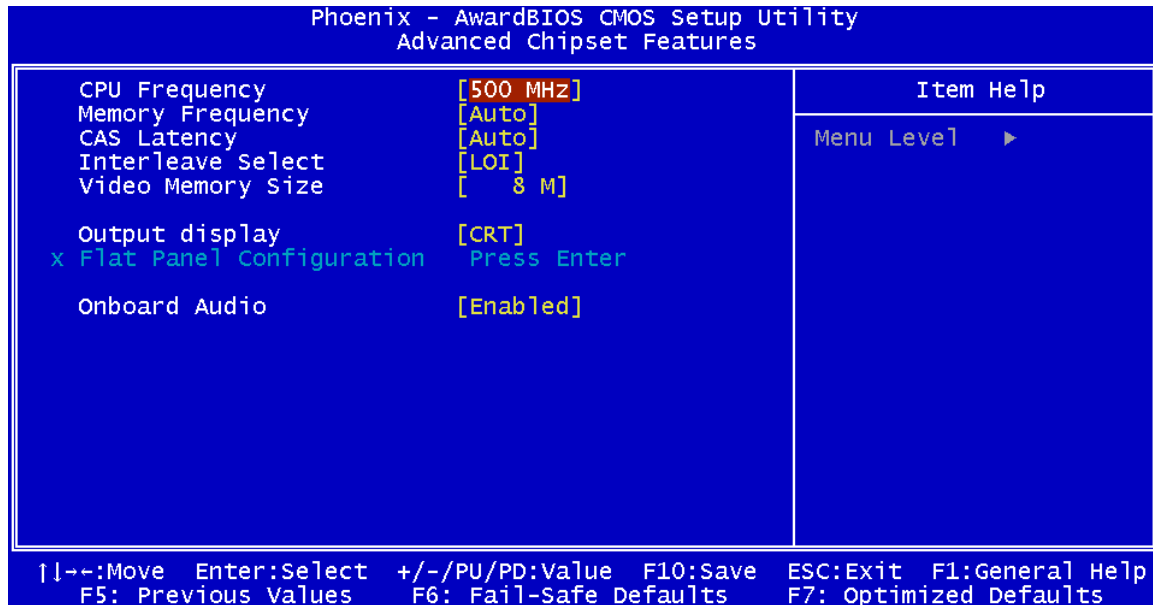
- **Disabled** (Default) EPA logo does not appear during boot up.
- **Enabled** EPA logo appears during boot up.



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### 6.4 Advanced Chipset Features

Use the Advanced Chipset Features menu (**BIOS Menu 5**) to change chipset configuration options.



#### BIOS Menu 5: Advanced Chipset Features

##### → CPU Frequency [500MHz]

Use the **CPU Frequency** option to set the CPU frequency.

- 500MHz (Default)

##### → Memory Frequency [Auto]

Use the **Memory Frequency** option to set the frequency of the installed DRAM modules.

The **Memory Frequency** options are:

- Auto (Default)
- DDR 200
- DDR 266
- DDR 333

**→ CAS Latency [Auto]**

Use the **CAS Latency Time** option to set the Column Address Strobe (CAS) delay time.

The **CAS Latency Time** options are:

- Auto (Default)
- 1.5 nanoseconds
- 2.0 nanoseconds
- 2.5 nanoseconds
- 3.0 nanoseconds
- 3.5 nanoseconds

**→ Interleave Select [LOI]**

Use the **Interleave Select** option to specify how the cache memory is interleaved.

- LOI** (Default) Low order interleaving (LOI) of memory occurs.
- HOI** High order interleaving (HOI) of memory occurs.

**→ Video Memory Size [8M]**

Use the **Video Memory Size** option to determine how much memory is allocated to the video graphics device. The **Video Memory Size** options are:

- None
- 8M (Default)
- 16M
- 32M
- 64M
- 128M
- 254M

**→ Output Display [CRT]**

Use the **Output Display** configuration to specify the display devices the system is connected to. The **Output Display** options are:

- Flat Panel

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- CRT (Default)
- Panel & CRT

### → Flat Panel Configuration [Press Enter]

Use the Flat Panel Configuration option to open the Flat Panel Configuration menu. The Flat Panel Configuration options are shown in **Section 6.4.1**.

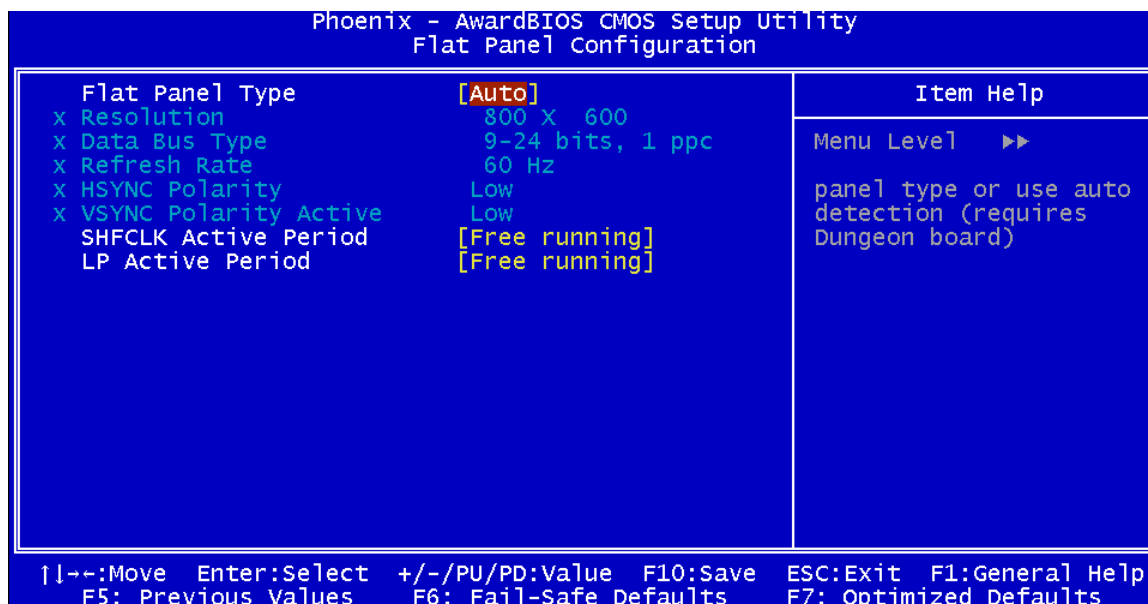
### → OnBoard Audio [Enabled]

Use the **OnBoard Audio** option to enable or disable the onboard codec.

- **Disabled**                      The onboard codec is disabled.
- **Enabled**    (Default)    The onboard codec is detected and enabled.

## 6.4.1 Flat Panel Configuration

Use the **Flat Panel Configuration** menu (**BIOS Menu 6**) to set the configuration settings for the flat panel screen connected to the system.



**BIOS Menu 6: Flat Panel Configuration**

**→ Flat Panel Type [Auto]**

Use the **Flat Panel Type** option to specify the type of flat panel screen connected to the system.

- TFT** Specifies the system is connected to a TFT display.
- LVDS** Specifies the system is connected to an LVDS display.
- Auto** (Default) The system detects the display type and the display settings.

**→ Resolution [800 x 600]**

The **Resolution** option can only be configured if the **Flat Panel Type** option is not set to **Auto**. Use the **Resolution** option to set the resolution of the flat panel screen connected to the system. The **Resolution** options are:

- 320 x 240
- 640 x 480
- 800 x 600 (Default)
- 1024 x 768
- 1152 x 864
- 1280 x 1024
- 1600 x 1200

**→ Data Bus Type [9 – 24 bits, 1 ppc]**

The **Data Bus Type** option can only be configured if the **Flat Panel Type** option is not set to **Auto**. Use the **Data Bus Type** option to set the bus type and the data bus width used to transfer data between the system and the flat panel screen connected to the system. The **Data Bus Type** options are:

- 9-24 bits, 1 ppc (Default)
- 18, 24 bits, 2 ppc

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### → Refresh Rate [60Hz]

The **Refresh Rate** option can only be configured if the **Flat Panel Type** option is not set to **Auto**. Use the **Refresh Rate** option to set the screen refresh rate required by the panel connected to the system. Check the documentation that came with the panel before setting this option. The **Refresh Rate** options are:

- 60Hz (Default)
- 70Hz
- 72Hz
- 75Hz
- 85Hz
- 90Hz
- 100Hz

### → HSYNC Polarity [Low]

The **HSYNC Polarity** option can only be configured if the **Flat Panel Type** option is not set to **Auto**. Use the **HSYNC Polarity** option to set the polarity of the HSYNC signal to the panel. The **HSYNC Polarity** options are:

- High
- Low (Default)

### → VSYNC Polarity Active [Low]

The **VSYNC Polarity Active** option can only be configured if the **Flat Panel Type** option is not set to **Auto**. Use the **VSYNC Polarity Active** option to set the polarity of the VSYNC signal to the panel. The **VSYNC Polarity Active** options are:

- High
- Low (Default)



**→ SHFCLK Active Period [Free Running]**

Use the **SHFCLK Active Period** option to set the SHFCLK. The **SHFCLK Active Period** options are:

- Active Only
- Free running (Default)

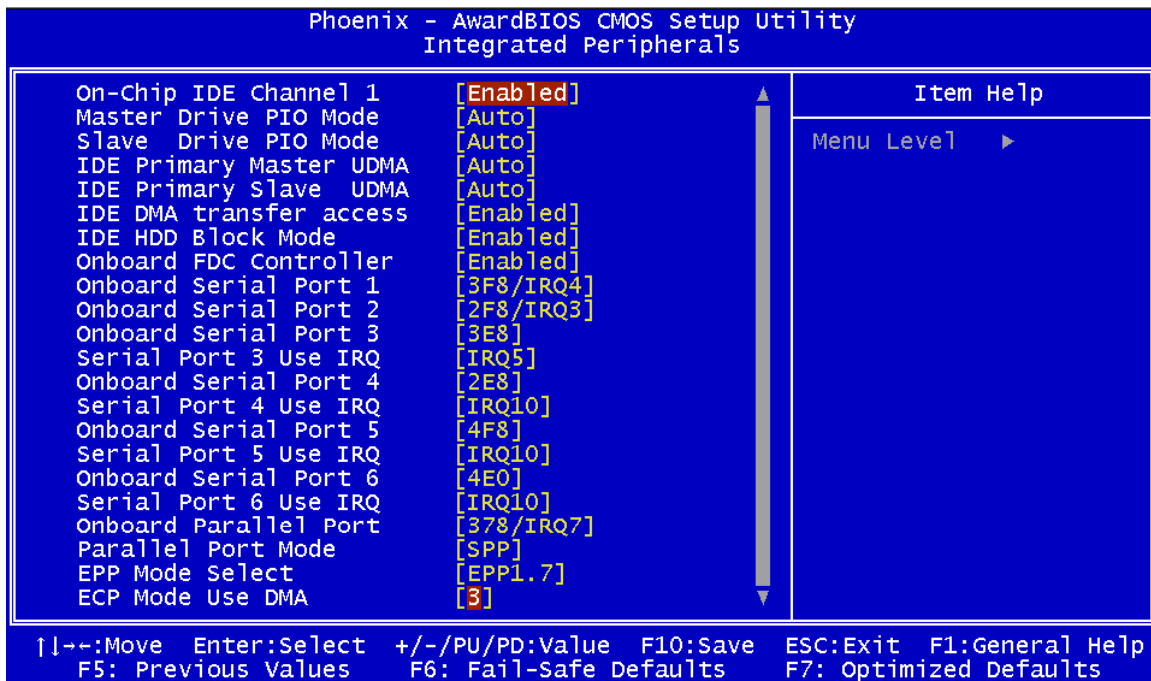
**→ LP Active Period [Free Running]**

Use the **LP Active Period** option to set the LDE/MOD signal to the panel. The **LP Active Period** options are:

- Active Only
- Free running (Default)

## 6.5 Integrated Peripherals

Use the Integrated Peripherals menu (**BIOS Menu 7**) to change the configuration options for the attached peripheral devices.



### BIOS Menu 7: Integrated Peripherals

#### ➔ On-Chip IDE Channel 1 [Enabled]

The **On-Chip IDE Channel 1** option is enabled and is NOT user configurable.

#### ➔ Drive PIO Mode [Auto]

Use the **Drive PIO Mode** options below to select the Programmed Input/Output (PIO) mode for the following HDDs:

- Master Drive PIO Mode
- Slave Drive PIO Mode

➔ **Auto** (Default) The computer selects the correct mode.

- ➔ **Mode 0**                      PIO mode 0 selected with a maximum transfer rate of 3.3MBps.
- ➔ **Mode 1**                      PIO mode 1 selected with a maximum transfer rate of 5.2MBps.
- ➔ **Mode 2**                      PIO mode 2 selected with a maximum transfer rate of 8.3MBps.
- ➔ **Mode 3**                      PIO mode 3 selected with a maximum transfer rate of 11.1MBps.
- ➔ **Mode 4**                      PIO mode 4 selected with a maximum transfer rate of 16.6MBps.

➔ **IDE UDMA [Auto]**

Use the **IDE UDMA** option below to select the Ultra DMA (UDMA) mode for the following HDDs:

- IDE Primary Master UDMA
- IDE Primary Slave UDMA

- ➔ **Auto**                      (Default)      The computer selects the correct UDMA.
- ➔ **Disabled**                      The UDMA for the HDD device is disabled.

➔ **IDE DMA transfer access [Enabled]**

Use the **IDE DMA transfer access** option to enable or disable DMA support for IDE devices connected to the system.

- ➔ **Disabled**                      All IDE drive DMA transfers are disabled. The IDE drives use PIO mode transfers.
- ➔ **Enabled**                      (Default)      All IDE drive DMA transfers are enabled.

➔ **IDE HDD Block Mode [Enabled]**

If the drive connected to the system supports block mode, use the **IDE HDD Block Mode** option to enable the system to detect the optimal number of block read/writes per sector the system IDE drive can support. Block mode is also called block transfer, multiple commands, or multiple sector read/write.

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- ➔ **Disabled** Block mode is not supported.
- ➔ **Enabled** (Default) Block mode is supported.

### ➔ Onboard FDC Controller [Enabled]

Use the **Onboard FDC Controller** option to enable or disable the onboard floppy controller. If the system is not connected to a floppy disk or uses an adapter for the FDD, this option can be disabled.

- ➔ **Disabled** The FDD controller is disabled.
- ➔ **Enabled** (Default) The FDD controller is enabled.

### ➔ Onboard Serial Port 1 [3F8/IRQ4]

Use the **Onboard Serial Port 1** option to select the I/O address and IRQ for the onboard serial port 1. The serial port can be disabled or the I/O address and the IRQ can be automatically selected by the BIOS. The **Onboard Serial Port 1** options are:

- Disabled
- 3F8/IRQ4 (Default)
- 2F8/IRQ3
- 3E8/IRQ4
- 2E8/IRQ3
- Auto

**→ Onboard Serial Port 2 [2F8/IRQ3]**

Use the **Onboard Serial Port 2** option to select the I/O address and IRQ for the onboard serial port 2. The serial port can be disabled or the I/O address and the IRQ can be automatically selected by the BIOS. The **Onboard Serial Port 2** options are:

- Disabled
- 3F8/IRQ4
- 2F8/IRQ3 (Default)
- 3E8/IRQ4
- 2E8/IRQ3
- Auto

**→ Onboard Serial Port # [XXX]**

Use the **Onboard Serial Port #** option to select the I/O address and IRQ for any additional onboard serial ports. The **Onboard Serial Port #** address options are:

- Disabled
- 3F8
- 2F8
- 3E8
- 2E8
- 4F8
- 4E0

**→ Serial Port # Use IRQ [XXX]**

Use the **Serial Port # Use IRQ** option to select the IRQ for the additional onboard serial ports listed above. The **Serial Port # Use IRQ** IRQ options are:

- IRQ5
- IRQ7
- IRQ10
- IRQ11



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### → Onboard Parallel Port [378/IRQ7]

Use the **Onboard Parallel Port** option to specify a logical LPT port address and corresponding interrupt for the physical parallel port. The **Onboard Parallel Port** options are:

- Disabled
- 378/IRQ7 (Default)
- 278/IRQ5
- 3BC/IRQ7

### → Parallel Port Mode [SPP]

Use the **Parallel Port Mode** option to select parallel port operation mode.

- **SPP** (Default) The parallel port operates in the standard parallel port (SPP) mode. This parallel port mode works with most parallel port devices but is slow.
- **EPP** The parallel port operates in the enhanced parallel port mode (EPP). The EPP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the SPP mode.
- **ECP** The parallel port operates in the extended capabilities port (ECP) mode. The ECP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the SPP mode.
- **ECP+EPP** The parallel port is compatible with both ECP and EPP devices.
- **Normal**

**→ x EPP Mode Select [EPP1.7]**

The **EPP Mode Select** option is only available if the **Parallel Port Mode** option is set to EPP mode. Use the **EPP Mode Select** option to select the parallel port mode standard for the parallel port.

- EPP1.9** EPP 1.9 is selected as the EPP standard.
- EPP1.7** (Default) EPP 1.7 is selected as the EPP standard.

**→ x ECP Mode Use DMA [3]**

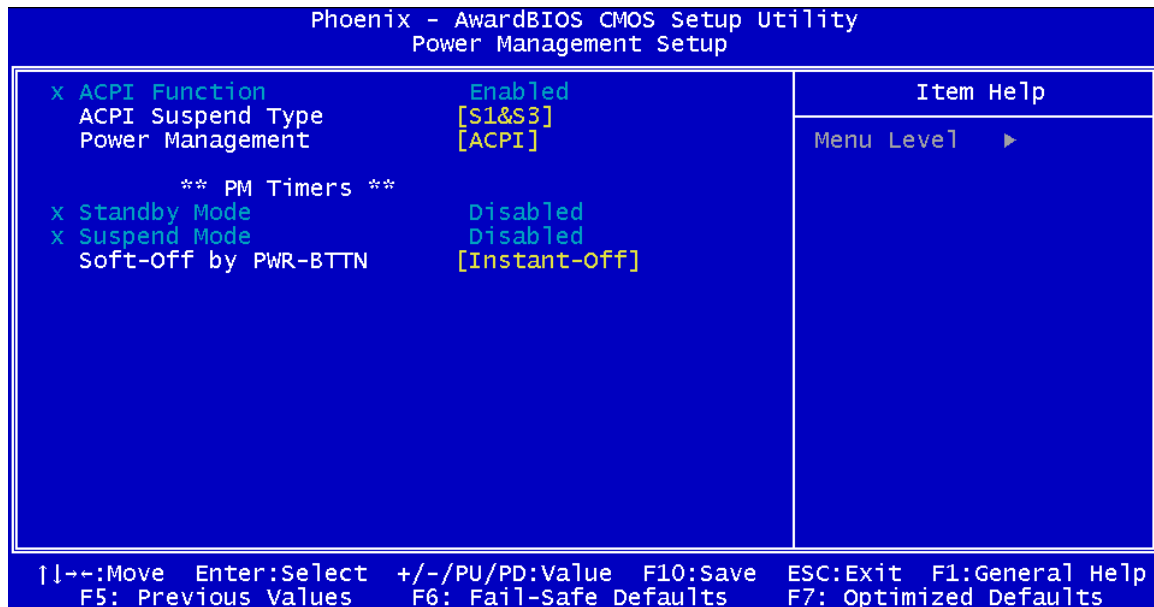
The **ECP Mode Use DMA** option is only available if the **Parallel Port Mode** option is set to ECP mode. Use the **ECP Mode Use DMA** option to specify the DMA channel the parallel port must use in the ECP mode.

- 1** The parallel port uses DMA Channel 1 in ECP mode.
- 3** (Default) The parallel port uses DMA Channel 3 in ECP mode.

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### 6.6 Power Management Setup

Use the **Power Management Setup** menu (**BIOS Menu 8**) to set the BIOS power management and saving features.



#### BIOS Menu 8: Power Management Setup

##### → x ACPI Function [Disabled]

The **ACPI Function** is enabled when the **Power Management** option is set to ACPI; otherwise, it is disabled.

##### → ACPI Suspend Type [S1&S3]

When the system is in the [S1&S3] suspend state, the system appears off. The CPU is stopped, RAM is refreshed and the system is runs in a low power mode.

- **S1(POS)**                      Sets the ACPI Suspend Type to POS (Power On Suspend).
- **S3(STR)**                      Sets the ACPI Suspend Type to STR (Suspend To RAM).
- **S1&S3**                      (Default)      Sets the ACPI Suspend Type to POS and STR.

## → Power Management [ACPI]

Use the **Power Management** option to set the power management type used by the system.

- **Disabled** All power management options are turned off. The only user configurable options are the power button and alarm settings.
- **Legacy** Standby and suspend modes can be set.
- **APM** Advanced power management (APM) is activated
- **ACPI** (Default) Advanced Configuration and Power Interface (ACPI) is activated.

## → x Standby Mode [Disabled]

The **Standby Mode** option can only be selected if the **Power Management** option is set to **Legacy**. The **Standby Mode** specifies the amount of time the system can be inactive before the system enters standby mode. The **Standby Mode** options are:

- Disabled (Default)
- 1 Sec
- 5 Sec
- 10 Sec
- 15 Sec
- 30 Sec
- 45 Sec
- 1 Min
- 5 Min
- 10 Min
- 15 Min
- 30 Min
- 45 Min
- 60 Min
- 90 Min
- 120 Min

## KINO-LX Mini-ITX SBC

### → x Suspend Mode [Disabled]

The **Suspend Mode** option can only be selected if the **Power Management** option is set to Legacy. The **Suspend Mode** specifies the amount of time the system can be inactive before the system enters suspend mode. The **Suspend Mode** options are:

- Disabled (Default)
- 1 Sec
- 5 Sec
- 10 Sec
- 15 Sec
- 30 Sec
- 45 Sec
- 1 Min
- 5 Min
- 10 Min
- 15 Min
- 30 Min
- 45 Min
- 60 Min
- 90 Min
- 120 Min

### → Soft-Off by PWR-BTTN [Instant-Off]

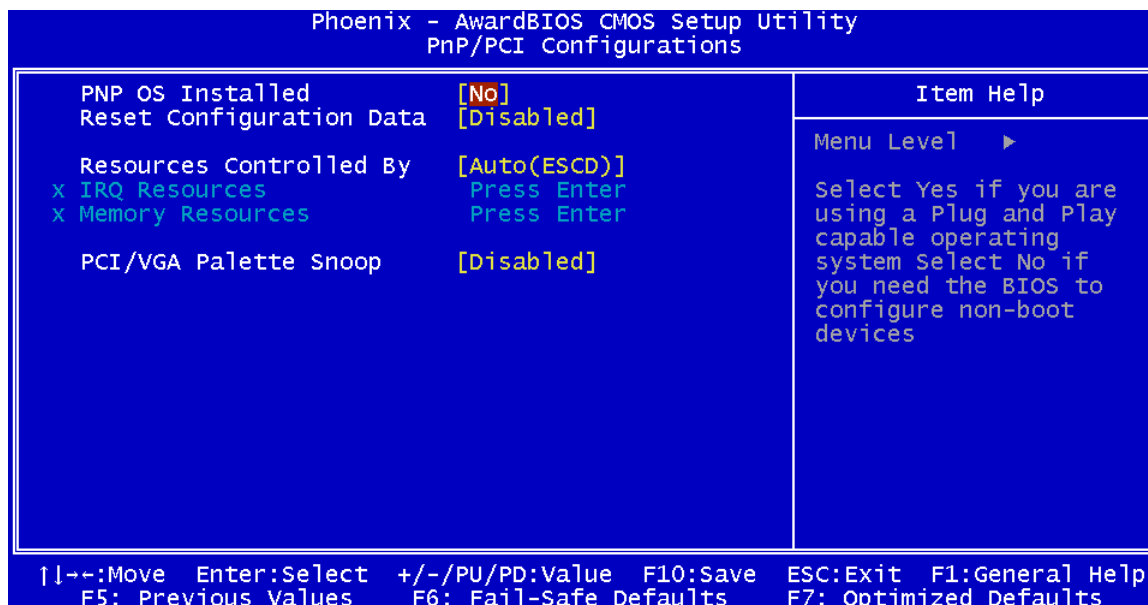
Use the **Soft-Off by PWR-BTTN** option to enabled the system to enter a very low-power-usage state when the power button is pressed.

- **Instant-Off** (Default) When the power button is pressed, the system is immediately shutdown.
- **Delay 4-sec** To shutdown the system the power button must be held down longer than four seconds otherwise the system enters a low power usage state.



## 6.7 PnP/PCI Configurations

Use the PnP/PCI Configurations menu (**BIOS Menu 9**) to set the plug and play, and PCI options.



### BIOS Menu 9: PnP/PCI Configurations

#### ➔ PNP OS Installed [No]

The **PNP OS Installed** option determines whether the Plug and Play devices connected to the system are configured by the operating system or the BIOS.

- ➔ No (Default) If the operating system does not meet the Plug and Play specifications, BIOS configures all the devices in the system.
- ➔ Yes Set this option if the system is running Plug and Play aware operating systems. The operating system changes the interrupt, I/O, and DMA settings.

#### ➔ Reset Configuration Data [Disabled]

Use the **Reset Configuration Data** option to reset the Extended System Configuration Data (ESCD) when exiting setup if booting problems occur after a new add-on is installed.

## KINO-LX Mini-ITX SBC

- ➔ **Disabled** (Default) ESCD will not be reconfigured
- ➔ **Enabled** ESCD will be reconfigured after you exit setup

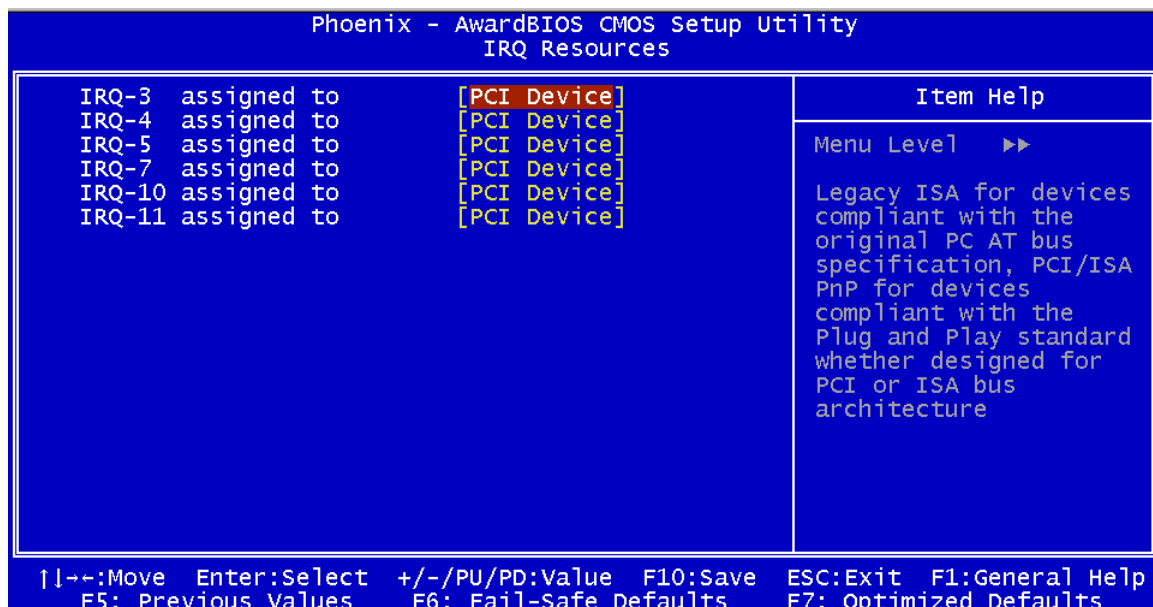
### ➔ Resources Controlled By [Auto (ESCD)]

Use the **Resources Controlled By** option to either manually configure all the boot and plug and play devices, or allow BIOS to configure these devices automatically. If BIOS is allowed to configure the devices automatically IRQs, DMA and memory base address fields cannot be set manually.

- ➔ **Auto(ESCD)** (Default) BIOS automatically configures plug and play devices as well as boot devices.
- ➔ **Manual** Manually configure the plug and play devices and any other boot devices.

### ➔ x IRQ Resources [Press Enter]

The IRQ Resources option (**BIOS Menu 10**) can only be selected if the Resources Controlled By option is set to Manual.



**BIOS Menu 10: IRQ Resources**

The **IRQ Resources** menu has the following options:

- IRQ-3 assigned to
- IRQ-4 assigned to
- IRQ-5 assigned to
- IRQ-7 assigned to
- IRQ-10 assigned to
- IRQ-11 assigned to

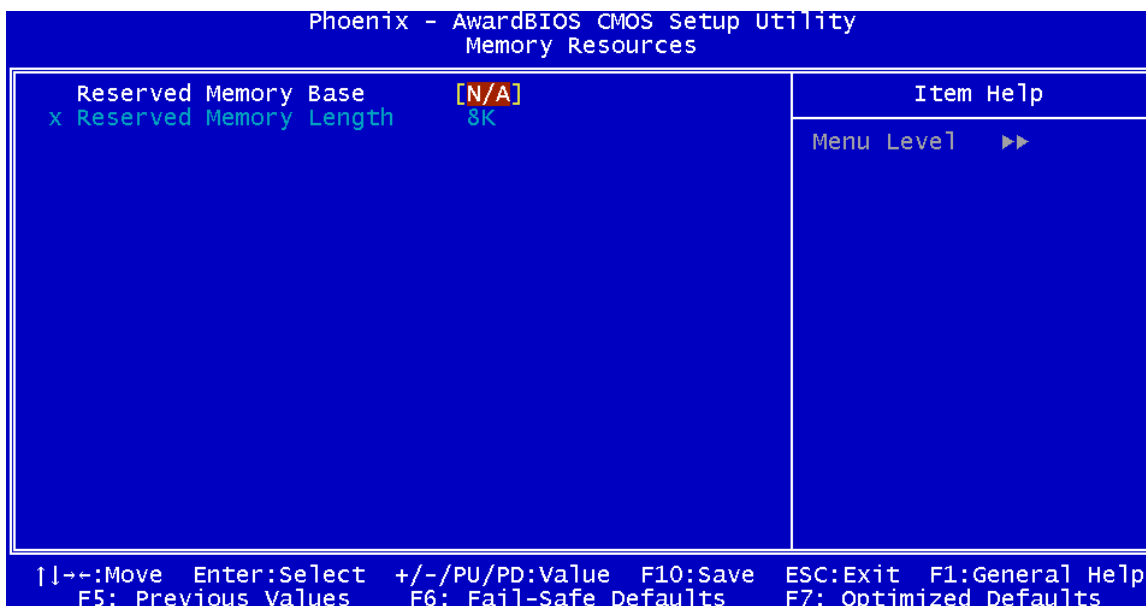
The above options all have the following default options.

- ➔ **PCI Device** (Default) The IRQ is assigned to legacy ISA for devices compliant with the original PC AT bus specification, PCI/ISA PNP for devices compliant with the Plug and Play standard whether designed for PCI or ISA bus architecture.
- ➔ **Reserved** The IRQ is reserved by BIOS.

➔ **x Memory Resources [Press Enter]**

The Memory Resources menu (**BIOS Menu 11**) can only be accessed if the Resources Controlled By option is set to Manual. Use Memory Resources to select a base address and the length for the memory area used by a peripheral that requires high memory.

## KINO-LX Mini-ITX SBC



## BIOS Menu 11: Memory Resources

The menu has two configurable options:

- Reserved Memory Base
- Reserved Memory Length

➔ **Reserved Memory Base [N/A]**

The **Reserved Memory Base** option specifies the base address for the peripheral device.

The **Reserved Memory Base** options are:

- N/A (Default)
- C800
- CC00
- D000
- D400
- D800
- DC00

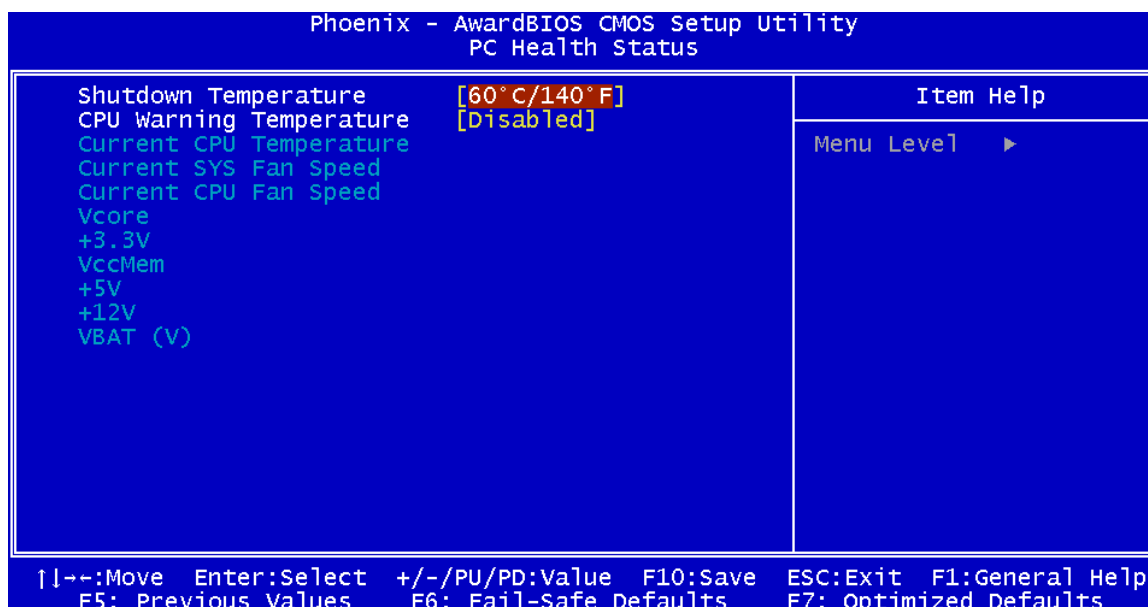
→ **x Reserved Memory Length [8K]**

The **Reserved Memory Length** option can only be accessed if the **Reserved Memory Base** option is not set to **N/A**. The **Reserved Memory Length** specifies the amount of memory reserved for the peripheral device. The **Reserved Memory Length** options:

- 8K (Default)
- 16K
- 32K
- 64K

## 6.8 PC Health Status

The **PC Health Status** menu (**BIOS Menu 12**) has two user configurable options, and shows system operating parameters that are essential to the stable operation of the system.



### BIOS Menu 12: PC Health Status

→ **Shutdown Temperature [60°C/140°F]**

Use the **Shutdown Temperature** option to specify a CPU operating temperature threshold that, when reached, would shutdown the system.



## KINO-LX Mini-ITX SBC

- 60°C/140°F (Default)
- 65°C/149°F
- 70°C/158°F
- Disabled

### → CPU Warning Temperature [Disabled]

Use the **CPU Warning Temperature** option to specify a CPU operating temperature threshold that, when reached, generates a warning signal.

- Disabled (Default)
- 50°C/122°F
- 53°C/127°F
- 56°C/133°F
- 60°C/140°F
- 63°C/145°F
- 66°C/151°F
- 70°C/158°F

The following system parameters are monitored by the **PC Health Status** menu:

### → Temperatures

The following temperature is monitored:

- Current CPU Temperature

### → Fan Speeds

The following fan speeds are monitored:

- Current SYS Fan Speed
- Current CPU Fan Speed

**→ Voltages**

The following voltages are monitored:

- Vcore
- VccMem
- +3.3 V
- +5 V
- +12 V
- VBAT (V)

Chapter

7

# Software Drivers

---

## 7.1 Available Software Drivers

---



### NOTE:

The content of the CD may vary throughout the life cycle of the product and is subject to change without prior notice. You may visit the IEI website or contact technical support for the latest updates.

---

The KINO-LX SBC has five software drivers:

- VGA Driver
- Audio Driver
- LAN Driver
- SATA/RAID Driver

All five drivers can be found on the CD that came with the SBC. To install the drivers please follow the instructions in the sections below.

Insert the CD into the system that contains the KINO-LX SBC.

---



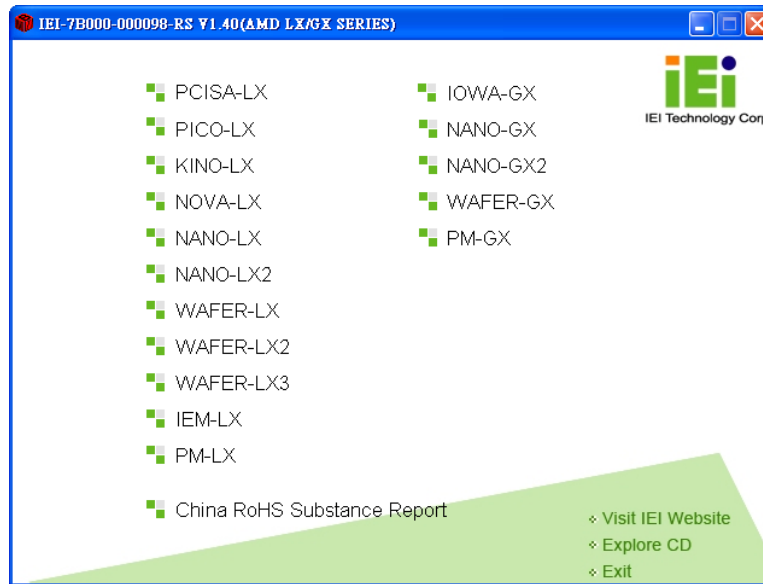
### NOTE:

If your system does not run the "autorun" program when the CD is inserted, click the **Start** button, select **Run**, then type **X:\autorun.exe** (replace **X** with the actual drive letter for your CD-ROM) to access the **IEI Driver CD** main menu.

---

**Step 1:** From the AMD LX/GX Driver CD main menu (**Figure 7-1**), click **KINO-LX**.

## KINO-LX Mini-ITX SBC



**Figure 7-1: AMD LX/GX CD Main Menu**

**Step 2:** A window appears listing the drivers available for installation (**Figure 7-2**).



**Figure 7-2: AMD LX/GX CD Driver Menu**

**Step 3:** Select any item from the list to view more information on the driver installation, or select Manual to navigate to the KINO-LX user manual.



The following sections fully describe the driver installation procedures for the KINO-LX SBC.

## 7.2 AMD VGA Installation



### NOTE:

This installation assumes the use of Windows XP as the operating system.

Follow the steps below to install the AMD VGA display device controller.

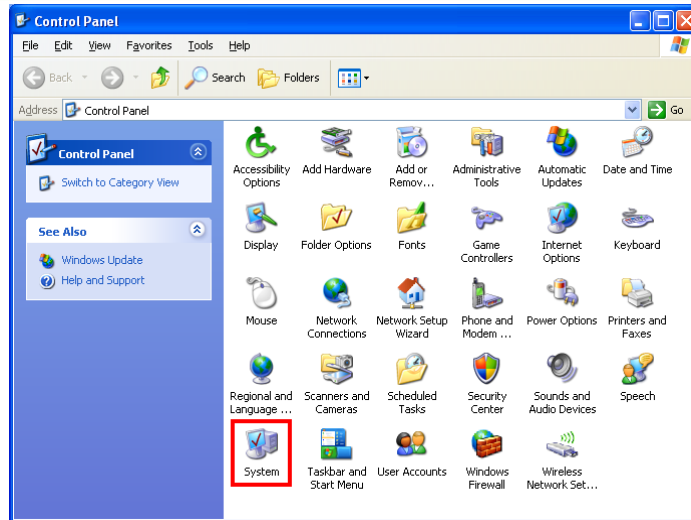
**Step 1:** Open **Windows Control Panel** from the **Start** menu (**Figure 7-3**).



**Figure 7-3: Access Windows Control Panel**

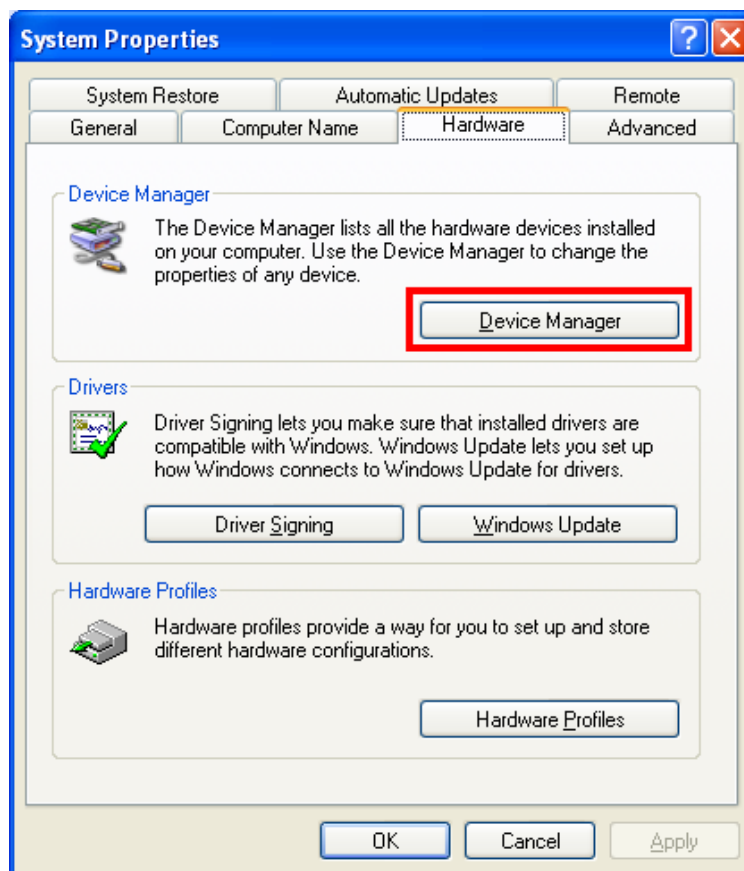
**Step 2:** Double-click the **System** icon (**Figure 7-4**).

## KINO-LX Mini-ITX SBC



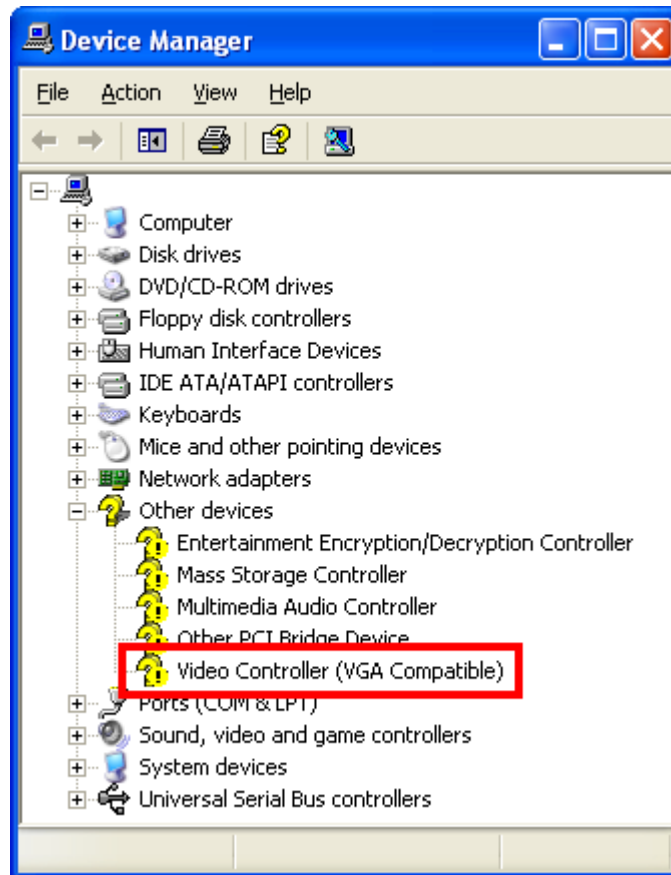
**Figure 7-4: Double Click the System Icon**

**Step 3:** Click the **Device Manager** tab (Figure 7-5).



**Figure 7-5: Click the Device Manager Tab**

**Step 4:** A list of system hardware devices appears (Figure 7-6).



**Figure 7-6: Device Manager List**

**Step 5:** Double-click the **Video Controller** device.

**Step 6:** The **Video Controller Properties** window appears (Figure 7-7).

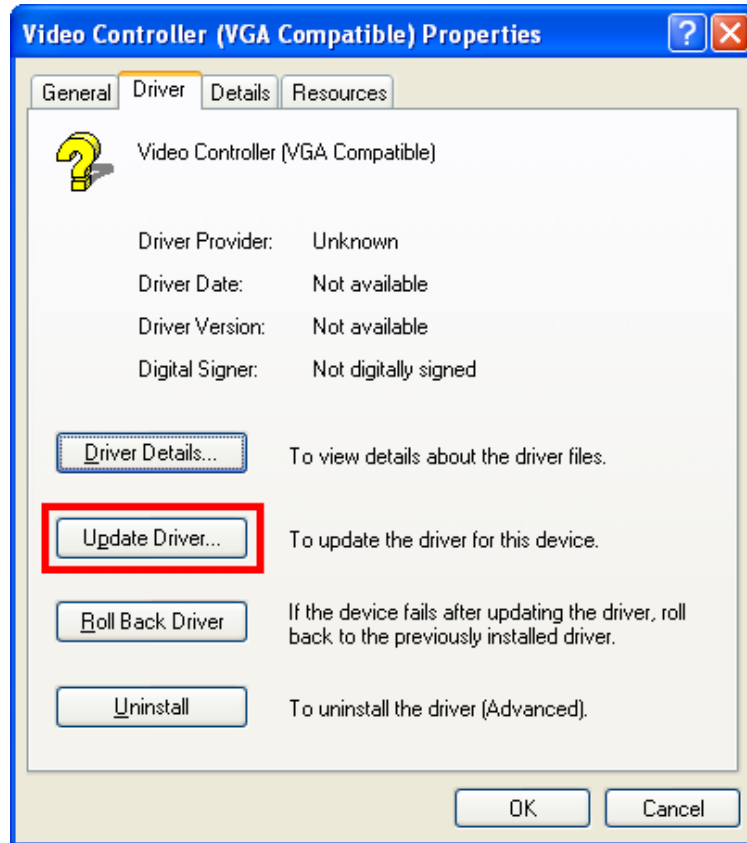


Figure 7-7: Video Controller Properties Window

**Step 7:** Click the **Update Driver** button in the **Driver** tab.

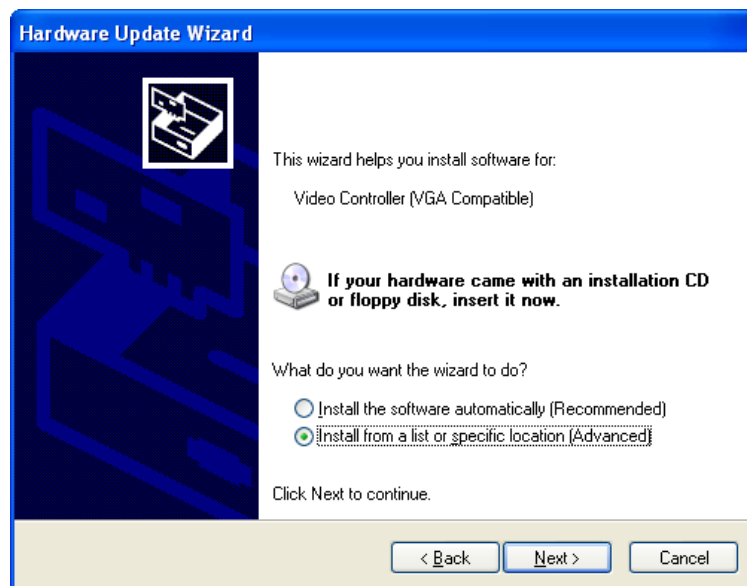
**Step 8:** The **Hardware Update Wizard** appears (Figure 7-8).



**Figure 7-8: Hardware Update Wizard**

**Step 9:** Select “**No, not this time,**” and click **NEXT** to continue.

**Step 10:** The following window (**Figure 7-9**) appears.



**Figure 7-9: Install Options Window**

**Step 11:** Select “**Install from a list or specific location...**” and click **NEXT** to continue.

**Step 12:** The following window (**Figure 7-10**) appears.



## KINO-LX Mini-ITX SBC

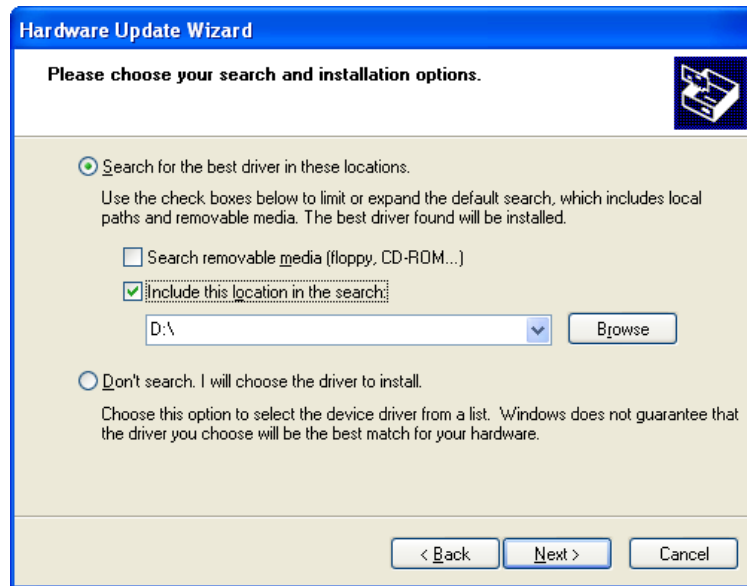


Figure 7-10: Search Options Window

**Step 13:** Select “**Search for the best driver in these locations,**” “**Include this location in the search,**” and click **BROWSE** to continue.

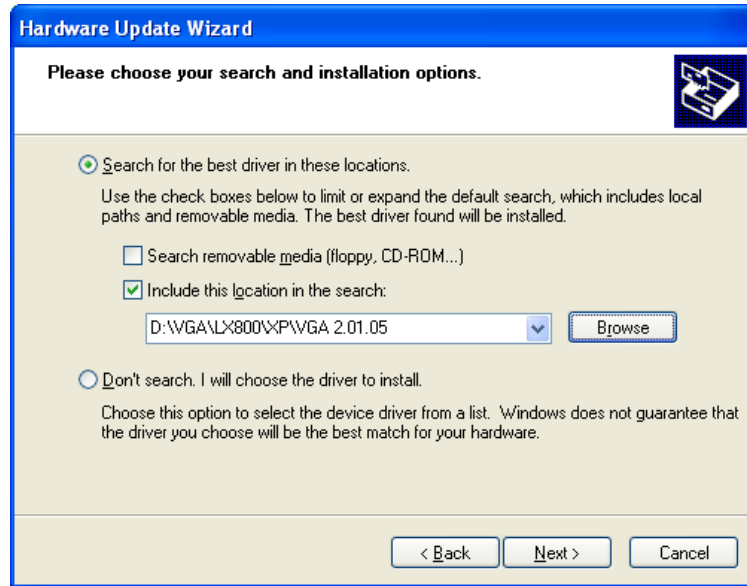
**Step 14:** The following window (**Figure 7-11**) appears.



Figure 7-11: Folder Selection Window

**Step 15:** Select the proper driver folder under the “X:\VGA\LX 800\XP” directory in the location browsing window, where “X:\” is the system CD drive, and click **Ok** to continue.

**Step 16:** The following window (**Figure 7-12**) appears.



**Figure 7-12: Search Options Window**

**Step 17:** Click **NEXT** to continue.

**Step 18:** The following window (**Figure 7-13**) appears as the OS searches for the driver.

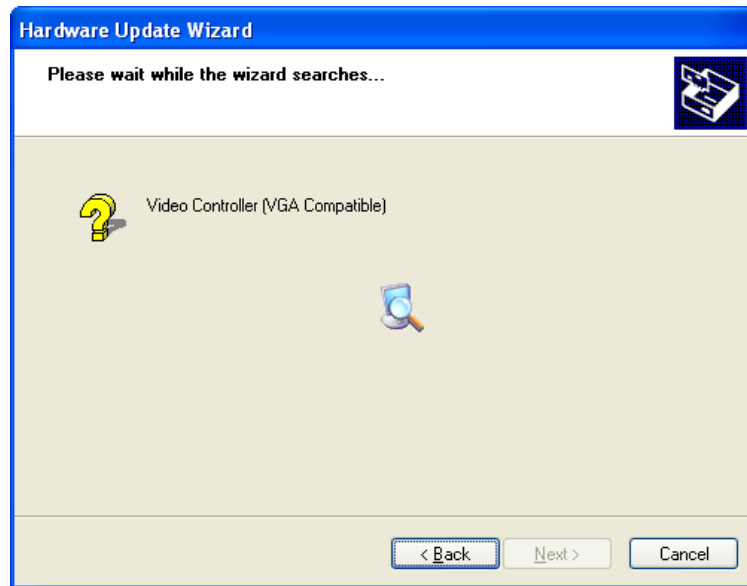


Figure 7-13: Hardware Update Wizard Search Window

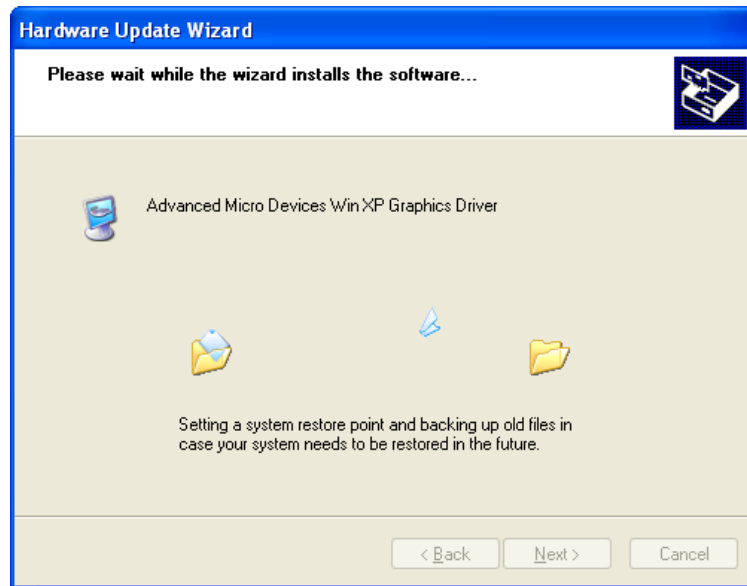
**Step 19:** The following window (Figure 7-14) appears.



Figure 7-14: Windows Logo Testing Window

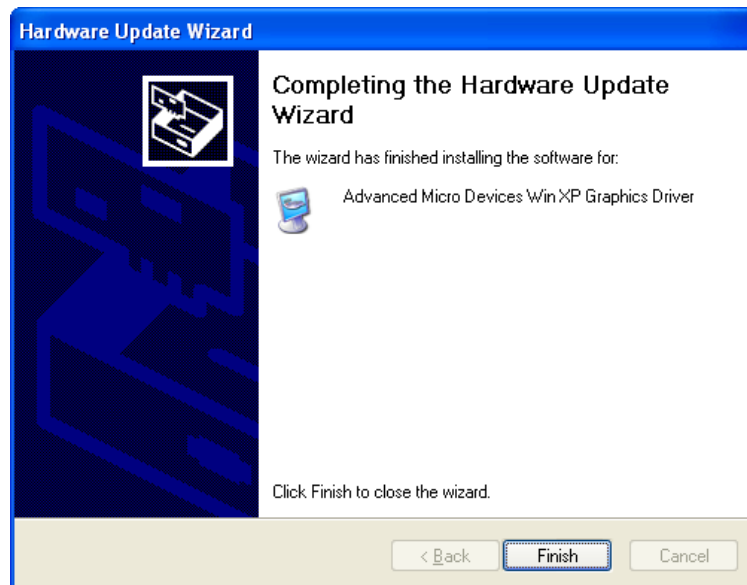
**Step 20:** Click **CONTINUE ANYWAY** to continue.

**Step 21:** The following window (Figure 7-15) appears as the driver is installed.



**Figure 7-15: Driver Installation Window**

**Step 22:** After the driver installation process is complete, a confirmation screen appears (Figure 7-16).



**Figure 7-16: Driver Installation Complete Window**

**Step 23:** Click **FINISH** to exit the program.

## KINO-LX Mini-ITX SBC

**Step 24:** The **Device Manager Window** now shows the installed AMD graphics driver

(Figure 7-17). [Step 24:](#)

格式化: 項目符

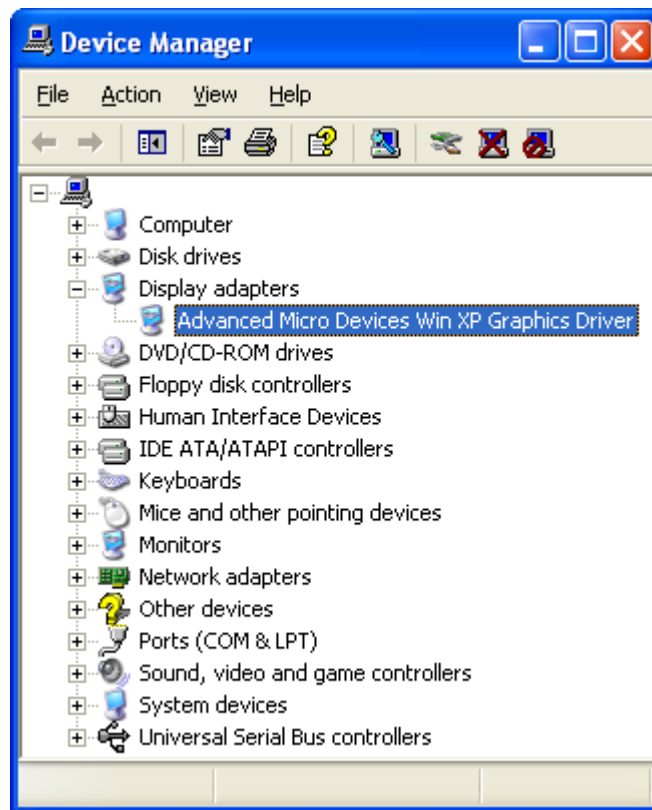


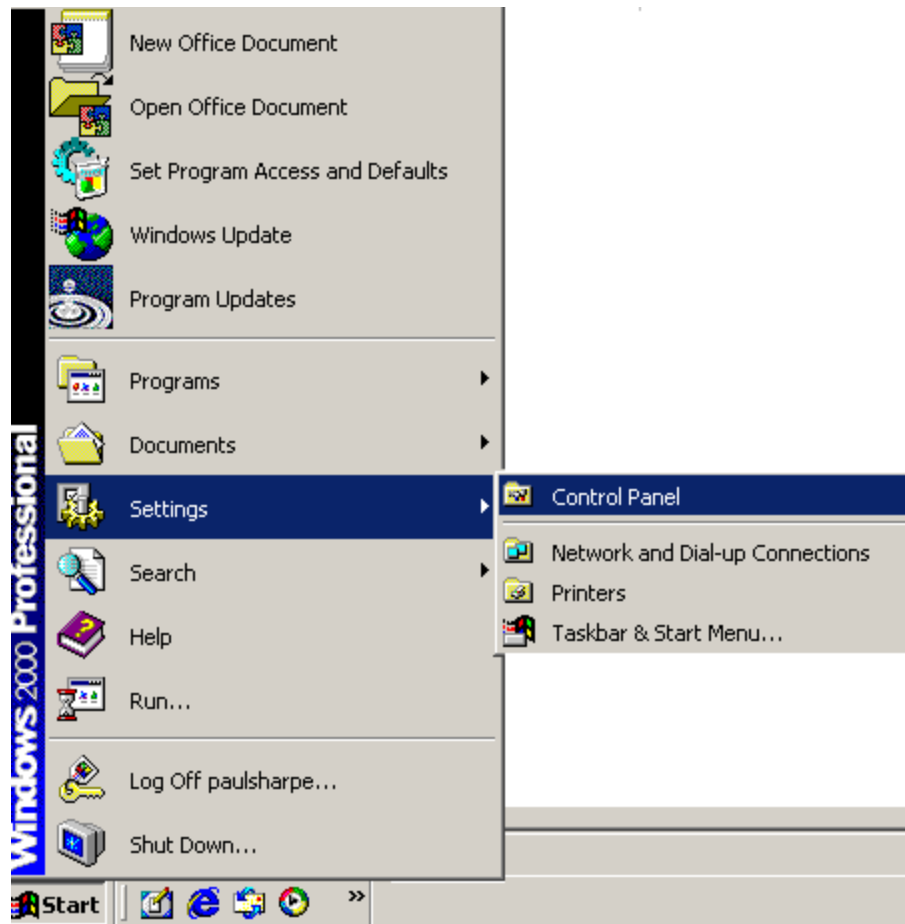
Figure 7-17: Device Manager Window

### 7.3 Audio Driver Installation

To install the audio driver please follow the steps below.

**Step 25:** Open **Windows Control Panel** (Figure 7-18).





**Figure 7-18: Access Windows Control Panel**

**Step 26:** Double click the **System** icon (Figure 7-19).

## KINO-LX Mini-ITX SBC

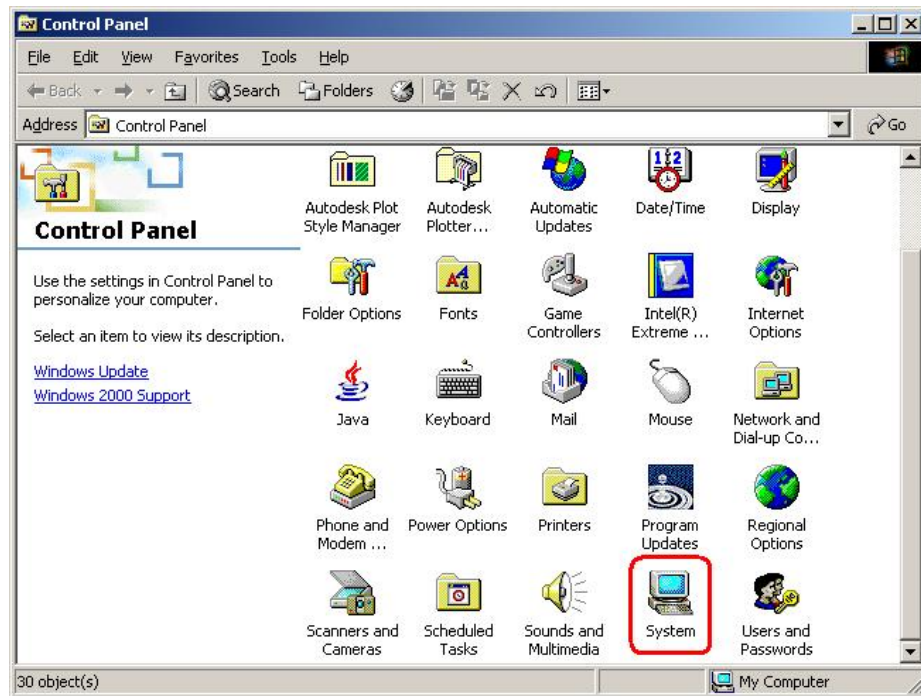


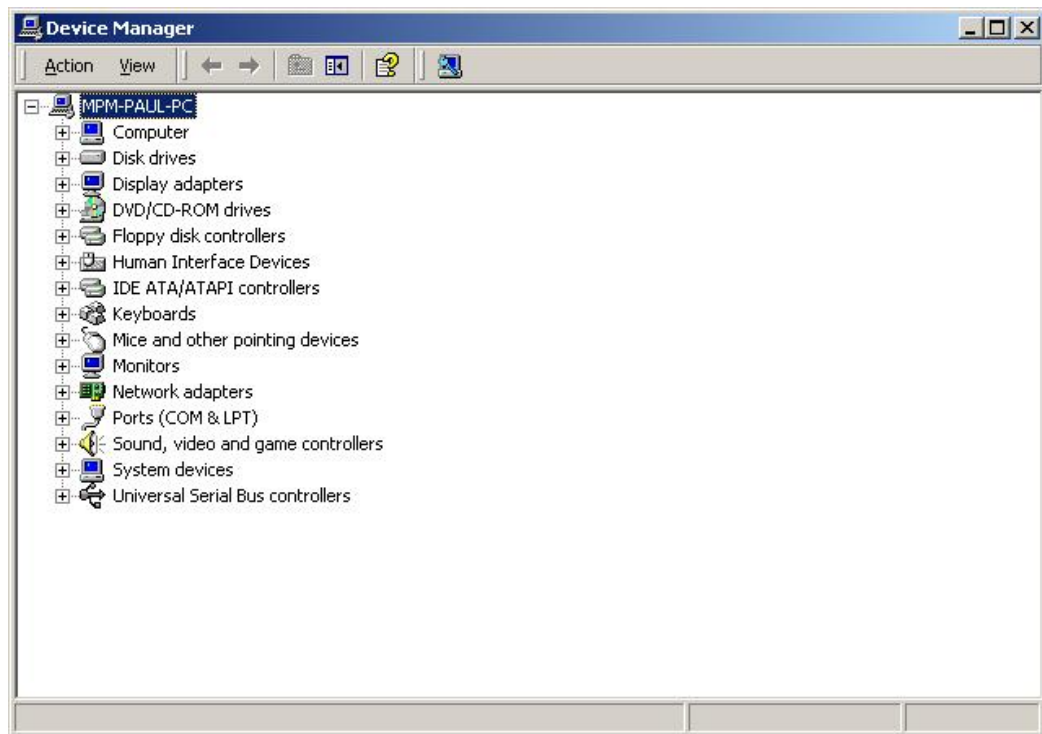
Figure 7-19: Double Click the System Icon

**Step 27:** Double click the **Device Manager** tab (Figure 7-20).



Figure 7-20: Double Click the Device Manager Tab

**Step 28:** A list of system hardware devices appears (Figure 7-21).



**Figure 7-21: Device Manager List**

**Step 29:** Double click the listed device that has question marks next to it. (This means Windows does not recognize the device).

**Step 30:** The **Device Driver Wizard** appears (**Figure 7-22**). Click **NEXT** to continue.



Figure 7-22: Search for Suitable Driver

**Step 31:** Select “Specify a Location” in the **Locate Driver Files** window (Figure 7-23).

Click **NEXT** to continue.





Figure 7-23: Locate Driver Files

**Step 32:** Select "X:\Audio\GeodeLX\_XP\_XPe\_WDM\_Audio\_v2.03.00" directory in the location browsing window, where "X:\\" is the system CD drive (Figure 7-24).



## KINO-LX Mini-ITX SBC

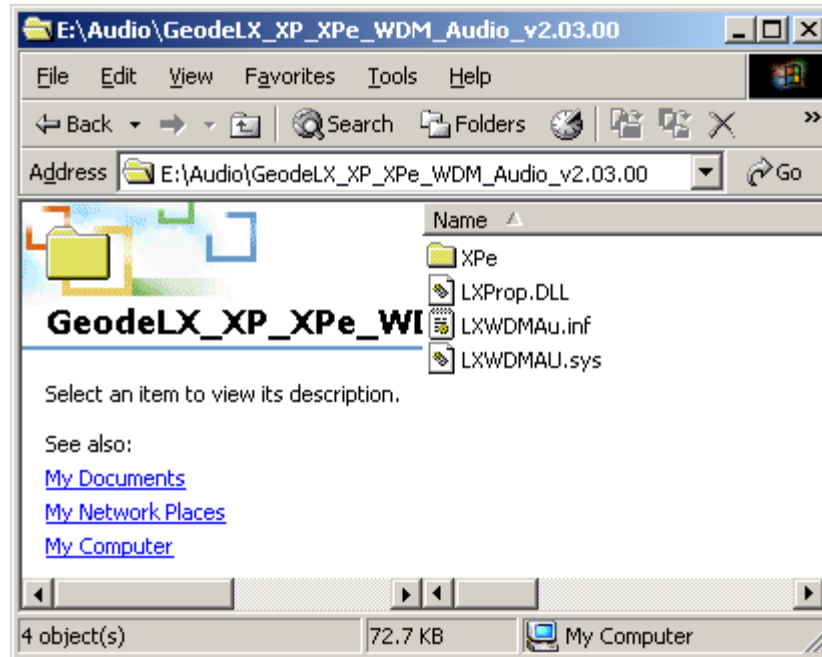


Figure 7-24: Location Browsing Window

**Step 33:** Click **OK** to continue. A driver files location menu window appears. Select the **LXWDMAu.inf** file and click **OPEN** to continue. The driver is installed.

## 7.4 LAN Driver

To install the LAN driver, please follow the steps below.

**Step 1:** Click **LAN** from the **AMD LX/GX CD Driver Menu** to open a window to the **X:\LAN\Realtek** (where **X:\** is the system CD drive) folder on the driver CD.

**Step 2:** Open the **RTL8100C** folder.

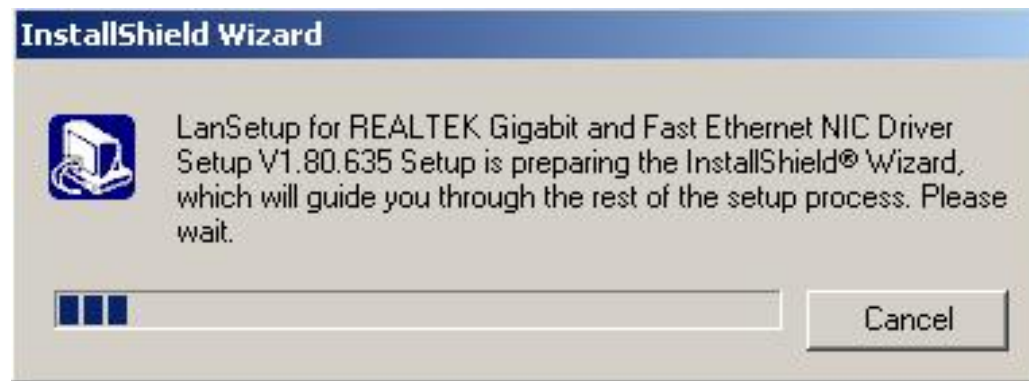
**Step 3:** Locate the **Setup** program icon (**Figure 7-25**).



**Figure 7-25: Locate the Setup Program Icon**

**Step 4:** Double click the **Setup** program icon in **Figure 7-25**.

**Step 5:** The **Install Shield Wizard** is prepared to guide the user through the rest of the process (**Figure 7-26**).



**Figure 7-26: Preparing Setup Screen**

**Step 6:** Once initialized, the **Install Wizard** welcome screen appears (**Figure 7-27**).

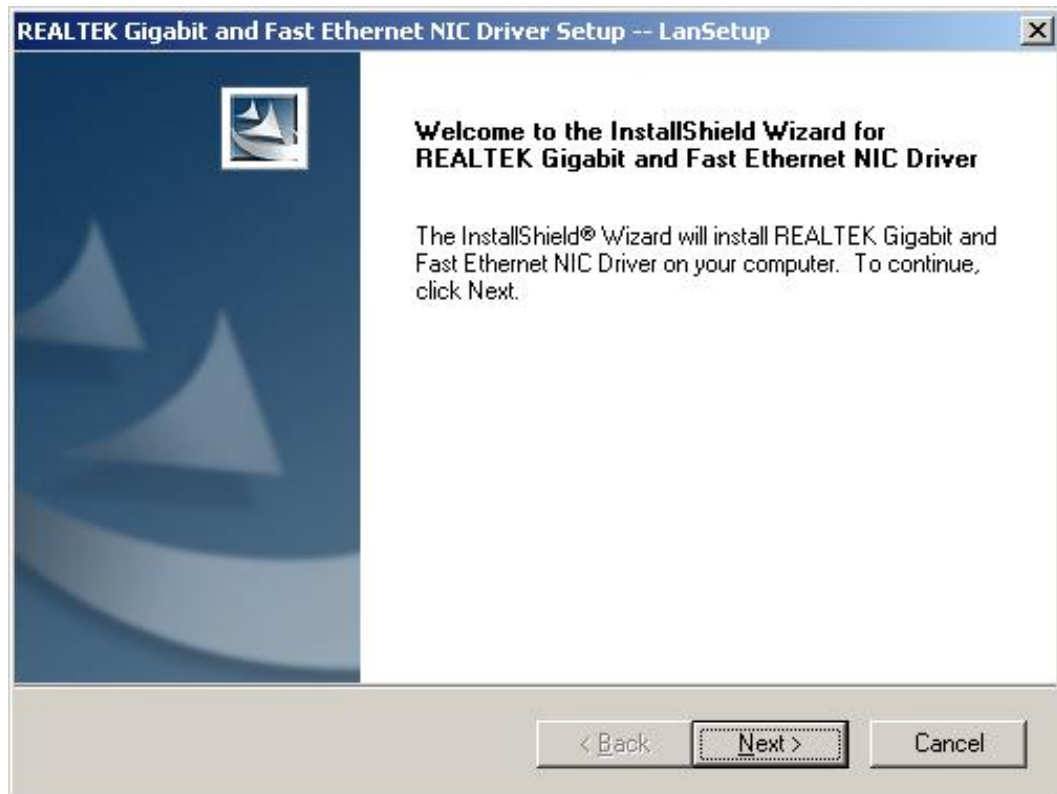


Figure 7-27: Install Wizard Welcome Screen

- Step 7:** Click **NEXT** to continue the installation or **CANCEL** to stop the installation.
- Step 8:** The **Install Wizard** starts to install the LAN driver.
- Step 9:** Once the installation is complete, the **InstallShield Wizard Complete** screen appears (**Figure 7-28**).

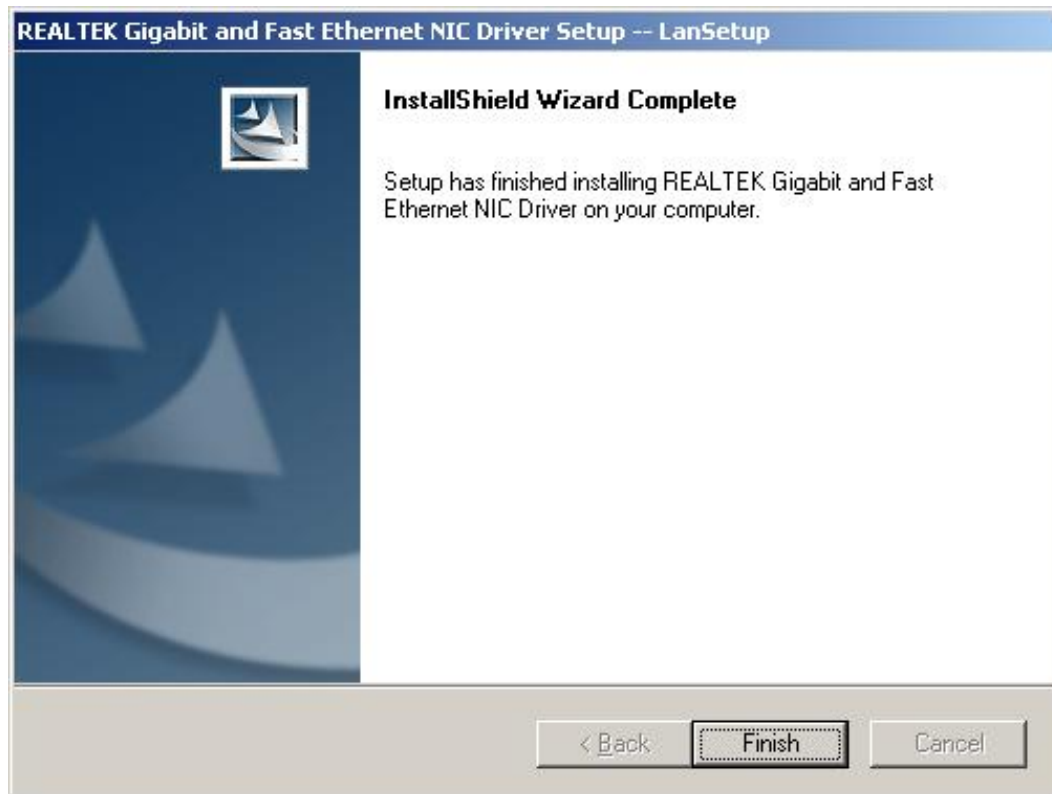


Figure 7-28: Installing Screen

**Step 10:** Click **FINISH** to complete the installation and exit the **Install Shield Wizard**.

**Step 11:** Once the installation process is complete, the computer may be restarted immediately or later. Select the preferred option and click **FINISH** to complete the installation process and exit the **Install Shield Wizard** (Figure 7-29).



Figure 7-29: Restart the Computer



## 7.5 SATA/RAID Driver

To install the ALi SATA/RAID driver, please follow the steps below.

**Step 12:** Open **Windows Control Panel** (錯誤! 找不到參照來源。).

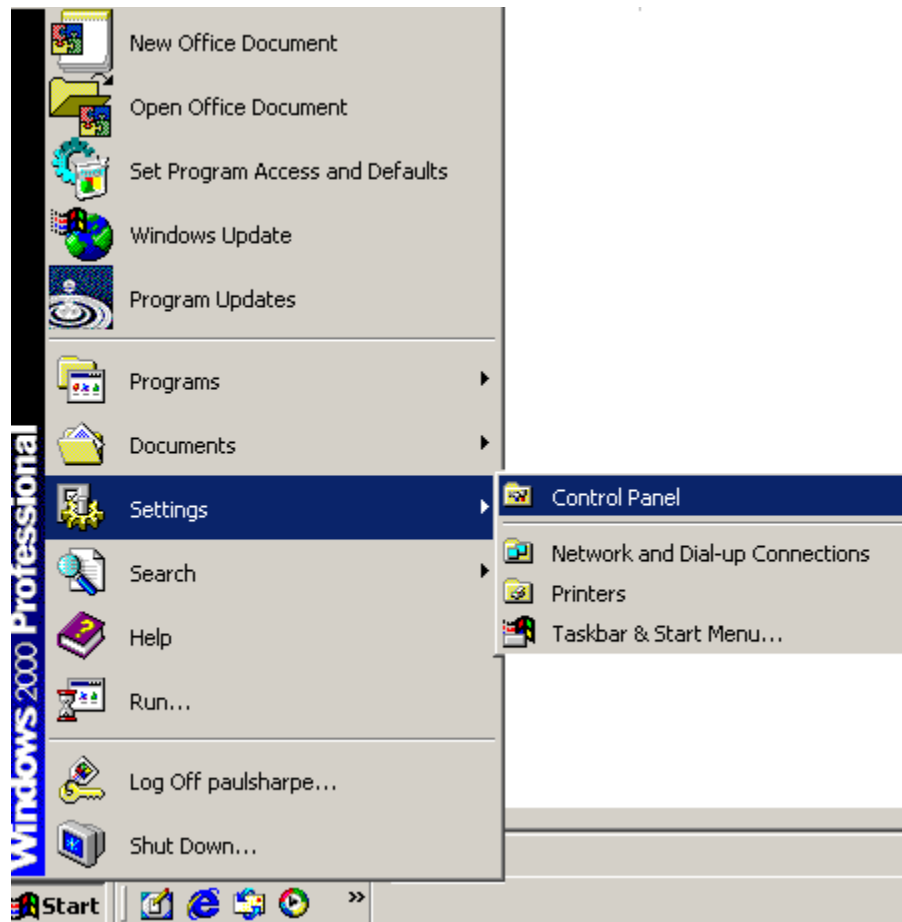


Figure 7-30: Access Windows Control Panel

**Step 13:** Double click the **System** icon (錯誤! 找不到參照來源。).

## KINO-LX Mini-ITX SBC

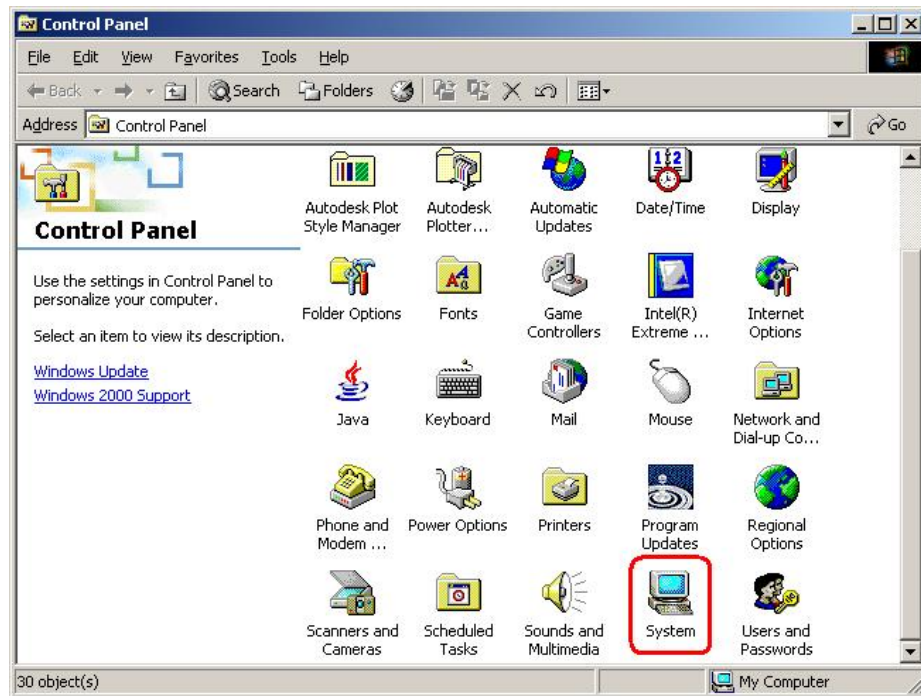


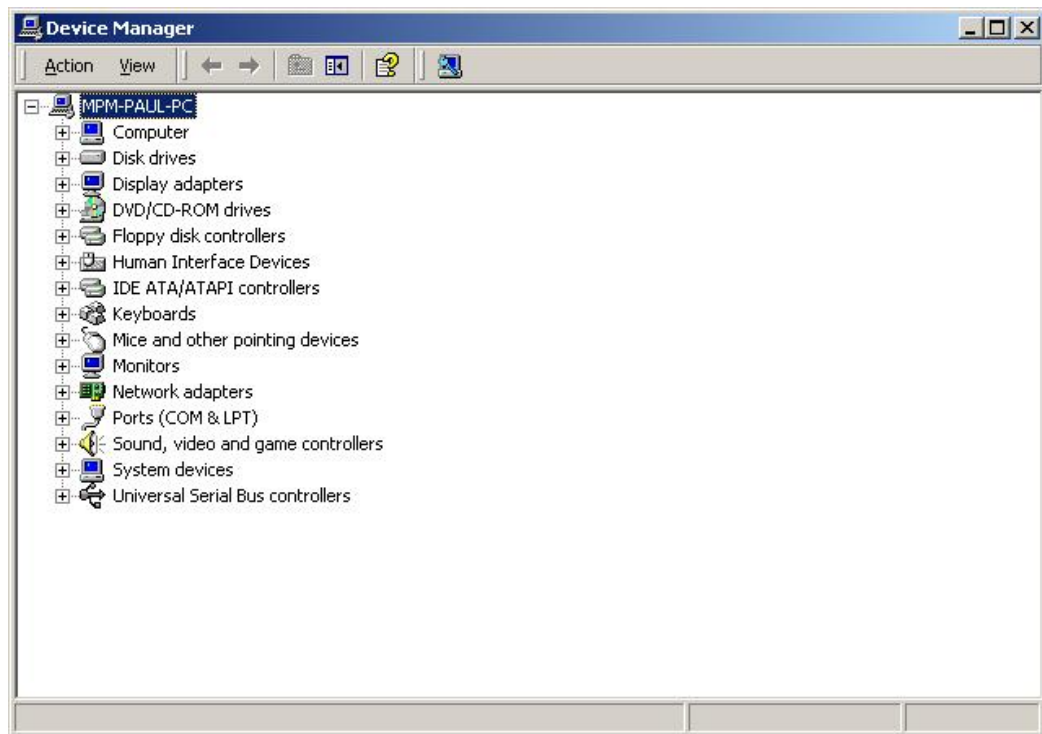
Figure 7-31: Double Click the System Icon

**Step 14:** Double click the **Device Manager** tab (錯誤! 找不到參照來源。).



Figure 7-32: Double Click the Device Manager Tab

**Step 15:** A list of system hardware devices appears (錯誤! 找不到參照來源。).



**Figure 7-33: Device Manager List**

**Step 16:** Double click the listed device that has question marks next to it. (This means Windows does not recognize the device).

**Step 17:** The **Device Driver Wizard** appears (錯誤! 找不到參照來源。). Click **NEXT** to continue.



Figure 7-34: Search for Suitable Driver

**Step 18:** Select “Specify a Location” in the **Locate Driver Files** window (錯誤! 找不到參照來源。). Click **NEXT** to continue.

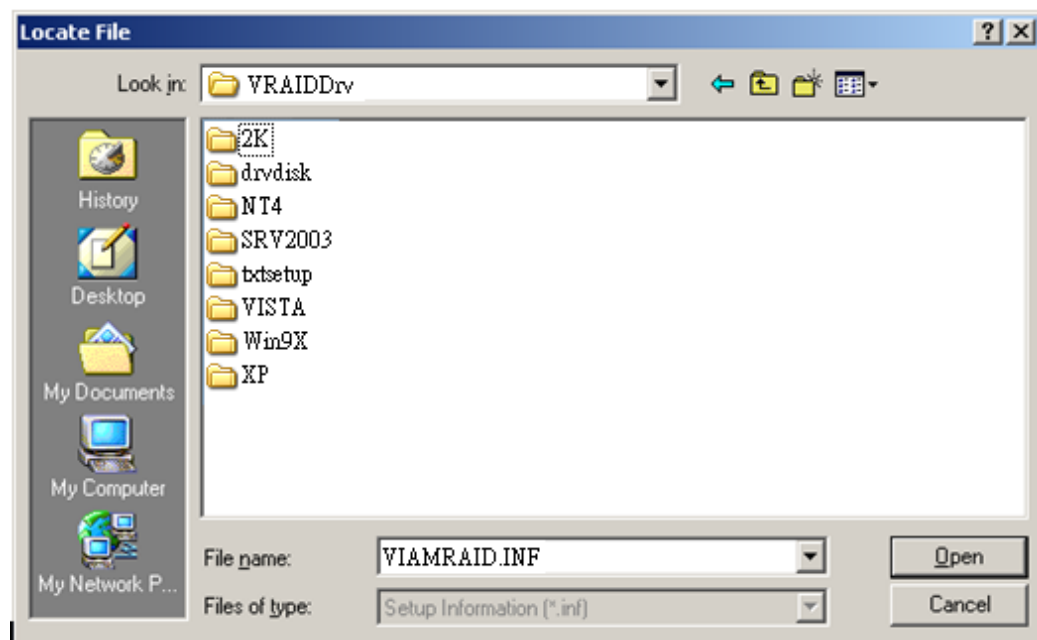




Figure 7-35: Locate Driver Files

**Step 19:** Select "X:\VIA VT6421\V-RAID\_V560A\VRAIDDrv" directory in the location browsing window, where "X:\\" is the system CD drive (錯誤! 找不到參照來源。).





**Figure 7-36: Location Browsing Window**

**Step 20:** Select a proper OS folder and click Open to continue.

**Step 21:** A driver files location menu window appears. Select the **VIAMRAID.INF** file and click Open to continue. The driver is installed.



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Appendix

A

# BIOS Configuration Options

---

## A.1 BIOS Configuration Options

Below is a list of BIOS configuration options described in **Chapter 6**.

Load Fail-Safe Defaults .....	95
Load Optimized Defaults.....	95
Set Supervisor Password .....	95
Set User Password .....	95
Save & Exit Setup .....	96
Exit Without Saving .....	96
Date [Day mm:dd:yyyy] .....	96
Time [hh/mm/ss] .....	96
IDE Master and IDE Slave .....	97
Drive A [1.44M, 3.5in].....	97
Drive B [None].....	97
Halt On [All, But Keyboard] .....	98
Base Memory: .....	98
Extended Memory .....	98
Total Memory.....	98
IDE HDD Auto-Detection [Press Enter].....	99
IDE Primary Master [Auto] .....	99
Access Mode [Auto] .....	100
Capacity .....	100
Cylinder.....	101
Head .....	101
Precomp.....	101
Landing Zone .....	101
Sector.....	101
Virus Warning [Disabled] .....	102
CPU Internal Cache [Enabled].....	103
Boot From LAN Control [Disabled].....	103
SATA Boot ROM Control [Disabled] .....	103
Boot Device .....	103

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Boot Other Device [Enabled] .....	104
Swap Floppy Drive [Disabled] .....	105
Boot Up Floppy Seek [Disabled] .....	105
Boot Up Numlock Status [On] .....	105
Gate A20 Option [Fast] .....	106
Typematic Rate Setting [Disabled] .....	106
Typematic Rate (Chars/sec) [6] .....	106
Typematic Delay (Msec) [250] .....	107
Security Option [Setup] .....	107
OS Select For DRAM > 64MB [Non-OS2] .....	108
Delay for HDD (Secs) [3] .....	108
Small Logo (EPA) Show [Disabled] .....	108
CPU Frequency [500MHz] .....	109
Memory Frequency [Auto] .....	109
CAS Latency [Auto] .....	110
Interleave Select [LOI] .....	110
Video Memory Size [8M] .....	110
Output Display [CRT] .....	110
Flat Panel Configuration [Press Enter] .....	111
OnBoard Audio [Enabled] .....	111
Flat Panel Type [Auto] .....	112
Resolution [800 x 600] .....	112
Data Bus Type [9 – 24 bits, 1 ppc] .....	112
Refresh Rate [60Hz] .....	113
HSYNC Polarity [Low] .....	113
VSYNC Polarity Active [Low] .....	113
SHFCLK Active Period [Free Running] .....	114
LP Active Period [Free Running] .....	114
On-Chip IDE Channel 1 [Enabled] .....	115
Drive PIO Mode [Auto] .....	115
IDE UDMA [Auto] .....	116
IDE DMA transfer access [Enabled] .....	116



IDE HDD Block Mode [Enabled] .....	116
Onboard FDC Controller [Enabled].....	117
Onboard Serial Port 1 [3F8/IRQ4].....	117
Onboard Serial Port 2 [2F8/IRQ3].....	118
Onboard Serial Port # [XXX] .....	118
Serial Port # Use IRQ [XXX] .....	118
Onboard Parallel Port [378/IRQ7] .....	119
Parallel Port Mode [SPP] .....	119
x EPP Mode Select [EPP1.7] .....	120
x ECP Mode Use DMA [3].....	120
x ACPI Function [Disabled].....	121
ACPI Suspend Type [S1&S3].....	121
Power Management [ACPI] .....	122
x Standby Mode [Disabled].....	122
x Suspend Mode [Disabled].....	123
Soft-Off by PWR-BTTN [Instant-Off] .....	123
PNP OS Installed [No] .....	124
Reset Configuration Data [Disabled] .....	124
Resources Controlled By [Auto (ESCD)].....	125
x IRQ Resources [Press Enter].....	125
x Memory Resources [Press Enter] .....	126
Reserved Memory Base [N/A].....	127
x Reserved Memory Length [8K].....	128
Shutdown Temperature [60°C/140°F] .....	128
CPU Warning Temperature [Disabled].....	129
Temperatures .....	129
Fan Speeds.....	129
Voltages .....	130

Appendix

**B**

# Terminology

---

AC '97	Audio Codec 97 (AC'97) refers to a codec standard developed by Intel® in 1997.
ACPI	Advanced Configuration and Power Interface (ACPI) is an OS-directed configuration, power management, and thermal management interface.
AHCI	Advanced Host Controller Interface (AHCI) is a SATA Host controller register-level interface.
AMD64	AMD64 is the name for the 64-bit instruction set on AMD architecture. AMD64 supports Intel's x86 instruction architecture and is almost identical to Intel's x86-64 architecture.
ATA	The Advanced Technology Attachment (ATA) interface connects storage devices including hard disks and CD-ROM drives to a computer.
APM	The Advanced Power Management (APM) application program interface (API) enables the inclusion of power management in the BIOS.
ARMD	An ATAPI Removable Media Device (ARMD) is any ATAPI device that supports removable media, besides CD and DVD drives.
ASKIR	Amplitude Shift Keyed Infrared (ASKIR) is a form of modulation that represents a digital signal by varying the amplitude ("volume") of the signal. A low amplitude signal represents a binary 0, while a high amplitude signal represents a binary 1.
BIOS	The Basic Input/Output System (BIOS) is firmware that is first run when the computer is turned on and can be configured by the end user
CODEC	The Compressor-Decompressor (CODEC) encodes and decodes digital audio data on the system.
CMOS	Complimentary metal-oxide-conductor is an integrated circuit used in chips like static RAM and microprocessors.
COM	COM refers to serial ports. Serial ports offer serial communication to expansion devices. The serial port on a personal computer is usually a

## KINO-LX Mini-ITX SBC

	male DB-9 connector.
DAC	The Digital-to-Analog Converter (DAC) converts digital signals to analog signals.
DDR	Double Data Rate refers to a data bus transferring data on both the rising and falling edges of the clock signal.
DMA	Direct Memory Access (DMA) enables some peripheral devices to bypass the system processor and communicate directly with the system memory.
DIMM	Dual Inline Memory Modules are a type of RAM that offer a 64-bit data bus and have separate electrical contacts on each side of the module.
DIO	The digital inputs and digital outputs are general control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.
EHCI	The Enhanced Host Controller Interface (EHCI) specification is a register-level interface description for USB 2.0 Host Controllers.
EIDE	Enhanced IDE (EIDE) is a newer IDE interface standard that has data transfer rates between 4.0 MBps and 16.6 MBps.
GPIO	General purpose input
HDD	Hard disk drive (HDD) is a type of magnetic, non-volatile computer storage device that stores digitally encoded data.
HyperTransport™ Bus	The HyperTransport™ bus, which uses HyperTransport™ technology, interfaces an AMD CPU with the Northbridge. HyperTransport™ technology provides a high-speed, low latency, point-to-point link between the CPU and the Northbridge.
IrDA	Infrared Data Association (IrDA) specify infrared data transmission protocols used to enable electronic devices to wirelessly communicate with each other.

L1 Cache	The Level 1 Cache (L1 Cache) is a small memory cache built into the system processor.
L2 Cache	The Level 2 Cache (L2 Cache) is an external processor memory cache.
LCD	Liquid crystal display (LCD) is a flat, low-power display device that consists of two polarizing plates with a liquid crystal panel in between.
LVDS	Low-voltage differential signaling (LVDS) is a dual-wire, high-speed differential electrical signaling system commonly used to connect LCD displays to a computer.
MAC	The Media Access Control (MAC) protocol enables several terminals or network nodes to communicate in a LAN, or other multipoint networks.
POST	The Power-on Self Test (POST) is the pre-boot actions the system performs when the system is turned-on.
RAID	Redundant Array of Inexpensive Disks (RAID) refers to redundantly backing up data on multiple disks to ensure that if one disk fails, the data is not lost and can be restored from the remaining disks in the array.
RAM	Random Access Memory (RAM) is volatile memory that loses data when power is lost. RAM has very fast data transfer rates compared to other storage like hard drives.
SATA	Serial ATA (SATA) is a serial communications bus designed for data transfers between storage devices and the computer chipsets. The SATA bus has transfer speeds up to 1.5 Gbps and the SATA II bus has data transfer speeds of up to 3.0 Gbps.
UART	Universal Asynchronous Receiver-transmitter (UART) is responsible for asynchronous communications on the system and manages the system's serial communication (COM) ports.
UHCI	The Universal Host Controller Interface (UHCI) specification is a register-level interface description for USB 1.1 Host Controllers.



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USB	The Universal Serial Bus (USB) is an external bus standard for interfacing devices. USB 1.1 supports 12Mbps data transfer rates, while USB 2.0 supports 480Mbps data transfer rates.
VGA	The Video Graphics Array (VGA) is a graphics display system developed by IBM.

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Appendix

C

# Watchdog Timer

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**NOTE:**

The following discussion applies to DOS environment. It is recommended you contact IEI support or visit our website for specific drivers for more sophisticated operating systems, e.g., Windows and Linux.

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMI or a software bug. When the CPU stops working correctly, Watchdog Timer will either perform a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer:

**INT 15H:**

<b>AH – 6FH Sub-function:</b>	
AL – 2:	Sets the Watchdog Timer's period.
BL:	Time-out value (Its unit-second is dependent on the item "Watchdog Timer unit select" in CMOS setup).

**Table C-1: AH-6FH Sub-function**

You have to call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer will start counting down. While the timer value reaches zero, the system will reset. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the Watchdog timer will be disabled if you set the time-out value to be zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

**NOTE:**

When exiting a program it is necessary to disable the Watchdog Timer, otherwise the system will reset.

**Example program:**

**; INITIAL TIMER PERIOD COUNTER**

;

**W\_LOOP:**

MOV AX, 6F02H ; setting the time-out value

MOV BL, 30 ; time-out value is 48 seconds

;

**; ADD YOUR APPLICATION PROGRAM HERE**

;

CMP EXIT\_AP, 1 ; is your application over?

JNE W\_LOOP ; No, restart your application

MOV AX, 6F02H ; disable Watchdog Timer

MOV BL, 0 ;

INT 15H

;

**; EXIT ;**



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Appendix

D

# Address Mapping

---

## D.1 I/O Address Map

I/O Address Range	Description
000-01F	DMA Controller
020-021	Interrupt Controller
040-043	System time
060-06F	Keyboard Controller
070-07F	System CMOS/Real time Clock
080-09F	DMA Controller
0A0-0A1	Interrupt Controller
0C0-0DF	DMA Controller
0F0-0FF	Numeric data processor
1F0-1F7	Primary IDE Channel
2F8-2FF	Serial Port 2 (COM2)
378-37F	Parallel Printer Port 1 (LPT1)
3B0-3BB	Intel(R) Graphics Controller
3C0-3DF	Intel(R) Graphics Controller
3F6-3F6	Primary IDE Channel
3F7-3F7	Standard floppy disk controller
3F8-3FF	Serial Port 1 (COM1)

**Table D-1: I/O Address Map**

## D.2 1<sup>st</sup> MB Memory Address Map

Memory address	Description
00000-9FFFF	System memory
A0000-BFFFF	VGA buffer
F0000-FFFFF	System BIOS
1000000-	Extend BIOS

**Table D-2: 1<sup>st</sup> MB Memory Address Map**

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### D.3 IRQ Mapping Table

IRQ#	Description	IRQ#	Description
IRQ0	System Timer	IRQ8	RTC clock
IRQ1	Keyboard	IRQ9	ACPI
IRQ2	Available	IRQ10	LAN
IRQ3	COM2	IRQ11	LAN/USB2.0/SATA
IRQ4	COM1	IRQ12	PS/2 mouse
IRQ5	SMBus Controller	IRQ13	FPU
IRQ6	FDC	IRQ14	Primary IDE
IRQ7	Available	IRQ15	Secondary IDE

Table D-3: IRQ Mapping Table

### D.4 DMA Channel Assignments

Channel	Function
0	Available
1	Available
2	Floppy disk (8-bit transfer)
3	Available
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available

Table D-4: IRQ Mapping Table

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Appendix

E

# Compatibility

---


**NOTE:**

The compatible items described here have been tested by the IEI R&D team and found to be compatible with the KINO-LX

## E.1 Compatible Operating Systems

The following operating systems have been successfully run on the KINO-LX.

- Microsoft Windows XP (SP2)
- Microsoft Win 2000 (SP4)
- Fedora Core 7
- Mandriva Linux 2007

## E.2 Compatible Memory Modules


**Note:**

The memory modules listed below have been tested on the KINO-LX other memory modules that comply with the specifications may also work on the KINO-LX but have not been tested.

The following memory modules have been successfully tested on the KINO-LX.

Manufacturer	Chip	Chip Model No.	Speed
Gigaram	Gigaram	D3208DL2T	400 MHz
Synnex	VM	VT56DD32M8PC-5	400 MHz
Elixir	Elixir	N2DS25680CS-5T	400 MHz
Elixir	Elixir	N2DS51280CS-5T	400 MHz
Kingston	PSC	A2S5GD3DBTP	400 MHz

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Kingston	HYNIX	HY5DU12822CTP-D43	400 MHz
Unigen	HYNIX	HY5DU12822CTP-D43	400 MHz
Unigen	HYNIX	HY5DU561622ETP-J	333 MHz
DSL	HYNIX	HY5DU56822DT-J	333 MHz
Ramex	Ramex	A5S25108T-HT	400 MHz
DSL	HYNIX	HY5DU12822CTP-J	333 MHz
Team	Micron	46V64MB8	400 MHz

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Appendix

**F**

# Hazardous Materials Disclosure

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## F.1 Hazardous Material Disclosure Table for IPB Products Certified as RoHS Compliant Under 2002/95/EC Without Mercury

The details provided in this appendix are to ensure that the product is compliant with the Peoples Republic of China (China) RoHS standards. The table below acknowledges the presences of small quantities of certain materials in the product, and is applicable to China RoHS only.

A label will be placed on each product to indicate the estimated “Environmentally Friendly Use Period” (EFUP). This is an estimate of the number of years that these substances would “not leak out or undergo abrupt change.” This product may contain replaceable sub-assemblies/components which have a shorter EFUP such as batteries and lamps. These components will be separately marked.

Please refer to the table on the next page.

## KINO-LX Mini-ITX SBC

Part Name	Toxic or Hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	x	O	O	O	O	x
Display	X	O	O	O	O	X
Printed Circuit Board	X	O	O	O	O	X
Metal Fasteners	X	O	O	O	O	O
Cable Assembly	X	O	O	O	O	X
Fan Assembly	X	O	O	O	O	X
Power Supply Assemblies	X	O	O	O	O	X
Battery	O	O	O	O	O	O
<p>O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in SJ/T11363-2006</p> <p>X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in SJ/T11363-2006</p>						

此附件旨在确保本产品符合中国 RoHS 标准。以下表格标示此产品中某有毒物质的含量符合中国 RoHS 标准规定的限量要求。

本产品上会附有“环境友好使用期限”的标签，此期限是估算这些物质“不会有泄漏或突变”的年限。本产品可能包含有较短的环境友好使用期限的可替换元件，像是电池或灯管，这些元件将会单独标示出来。

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
壳体	X	O	O	O	O	X
显示	X	O	O	O	O	X
印刷电路板	X	O	O	O	O	X
金属螺帽	X	O	O	O	O	O
电缆组装	X	O	O	O	O	X
风扇组装	X	O	O	O	O	X
电力供应组装	X	O	O	O	O	X
电池	O	O	O	O	O	O
<p>O: 表示该有毒有害物质在该部件所有物质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。</p> <p>X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。</p>						

Appendix

G

# External AC'97 Audio CODEC

---

## G.1 Introduction

The motherboard comes with an onboard Realtek ALC203 CODEC. Realtek ALC203 is a 16-bit, full duplex AC'97 Rev. 2.3 compatible audio CODEC with a sampling rate of 48KHz.

### G.1.1 Accessing the AC'97 CODEC

The CODEC is accessed through three phone jacks on the rear panel of the motherboard.

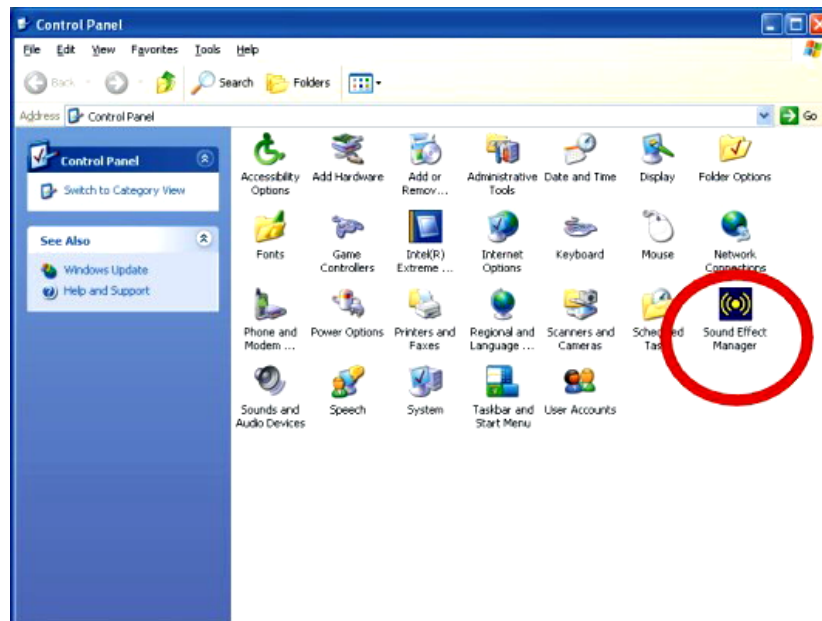
The phone jacks include:

3. A LINE input shared with surround output
4. A MIC input shared with Center and LFE output
5. A LINE output
6. A MIC input line.

### G.1.2 Driver Installation

The driver installation has been described in Section 7.3.

After rebooting, the sound effect configuration utility appears in the **Windows Control Panel (Figure G-1)**. If the peripheral speakers are properly connected, sound effects should be heard.





## KINO-LX Mini-ITX SBC

Figure G-1: Control Panel Sound Effect Manager

## G.2 Sound Effect Configuration

### G.2.1 Accessing the Sound Effects Manager

To access the Sound Effects Manager, please do the following:

**Step 1:** Install the audio CODEC driver.

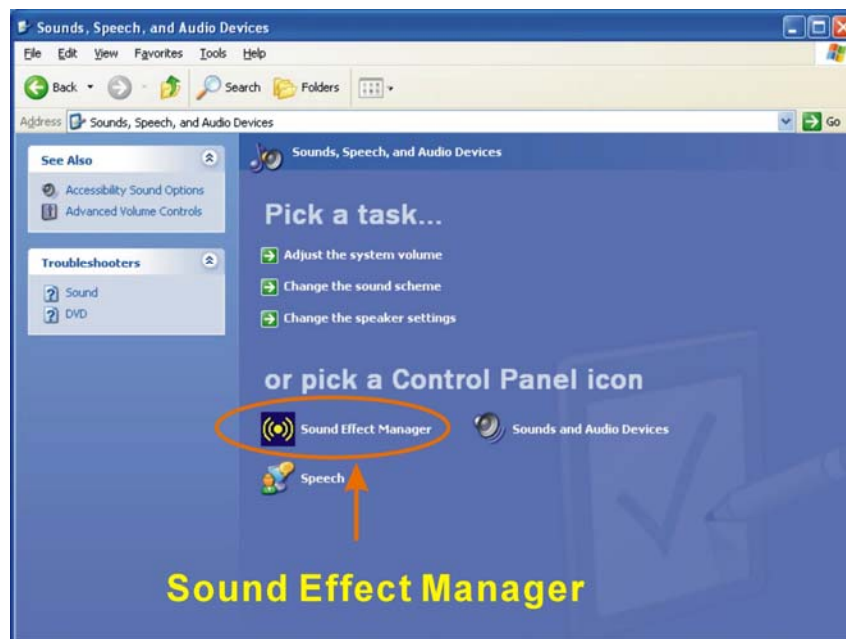
**Step 2:** Click either:

- The **Sound Effect Manager** icon in the **Notification Area** of the system task bar (**Figure G-2**), or
- The **Sound Effect Manager** icon in the **Control Panel** (**Figure G-3**).

Sound Effect Manager

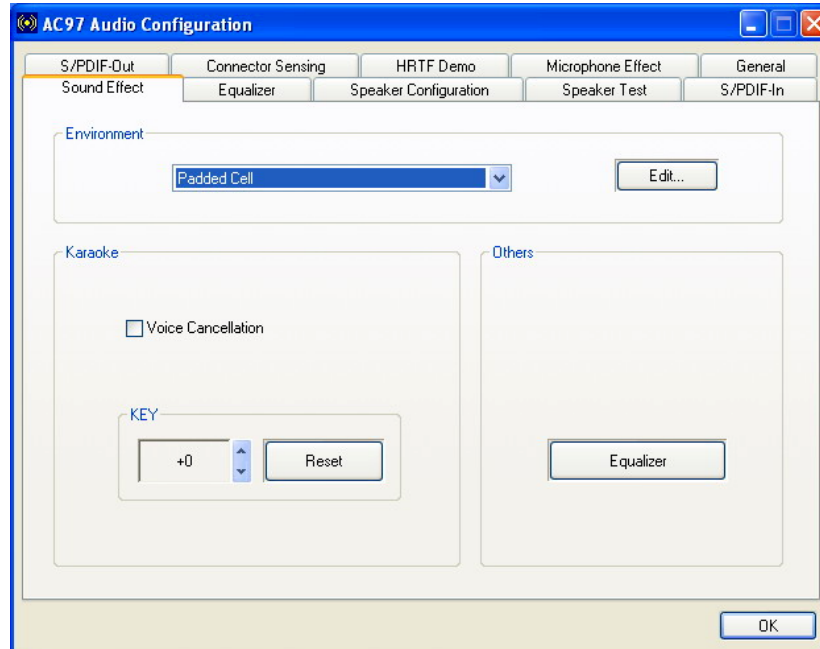


Figure G-2: Sound Effect Manager Icon [Task Bar]



**Figure G-3: Sound Effect Manager Icon [Control Panel]**

**Step 3:** The sound effect manager appears (**Figure G-4**).



**Figure G-4: Sound Effects Manager (ALC203)**



**NOTE:**

The Sound Effect Manager shown in **Figure G-4** is for the RealTek ALC203 audio CODEC. Different CODECs may have different sound manager appearances.

The following section describes the different configuration options in the Sound Effect Manager.

## G.2.2 Sound Effect Manager Configuration Options

## KINO-LX Mini-ITX SBC

The **Sound Effects Manager** enables configuration of the items listed below. To configure these items click the corresponding menu tab in the **Sound Effects Manager (Figure G-4)**.



### NOTE:

The Karaoke Mode is configured in the **Sound Effect** menu. To access Karaoke configuration settings, click on the **Sound Effect** menu tab.

- 
- Sound Effect
  - Karaoke Mode
  - Equalizer
  - Speaker Configuration
  - Speaker Test
  - S/PDIF-In
  - S/PDIF-Out
  - Connector Sensing
  - HRTF Demo
  - Microphone Effect
  - General



### NOTE:

Not all RealTek Sound Effect Managers have all the above listed options. The Sound Effect Manager loaded onto the system may only have some of the options listed above.

---

Below is a brief description of the available configuration options in the **Sound Effects Manager**.

- **Sound Effect**:- Select a sound effect from the 23 listed options in the drop

down menu. Selected sound effect properties can be edited. To edit the sound effect click **EDIT**.

- **Karaoke Mode:-** The **Karaoke Mode** is accessed in the Sound Effect window. The **Voice Cancellation** disables the vocal part of the music being played. The **Key adjustment** up or down arrow icons enables users to define a key that fits a certain vocal range.
- **Equalizer Selection:-** Preset equalizer settings enable easy audio range settings. Ten frequency bands can be configured.
- **Speaker Configuration:-** Multi-channel speaker settings are configured in this menu. Configurable options include:
  - Headphone
  - Channel mode for stereo speaker output
  - Channel mode for 4 speaker output
  - Channel mode for 5.1 speaker output
  - Synchronize the phonejack switch with speakers settings
- **Speaker Test:-** Each speaker connected to the system is tested individually to see if the 4-channel or 6-channel audio operates properly.
- **S/PDIF-In & S/PDIF-Out:-** These functions are currently not supported.
- **Connector Sensing:-** Realtek ALC203 detects if an audio device is plugged into the wrong connector. If an incorrect device is plugged in, a warning message appears.
- **HRTF Demo:-** Adjust HRTF (Head Related Transfer Functions) 3D positional audio here before running 3D applications.
- **Microphone Effect:-** Microphone noise suppression is enabled in this menu.
- **General:-** General information about the installed AC'97 audio configuration utility is listed here.

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